Sand Hill Wind Project
Final Subsequent Environmental Impact Report

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Acronyms and Abbreviations

Term	Definition
μg/m³	microgram per cubic meter
AADT	annual average daily traffic
AAQA	ambient air quality analysis
AB	Assembly Bill
ABAG	Association of Bay Area Governments
ACDEH	Alameda County Department of Environmental Health
ACE	Altamont Corridor Express
ACFD	Alameda County Fire Department
ACHP	Advisory Council on Historic Preservation
ACPWA	Alameda County Public Works Agency,
ADC	Alternative Daily Cover
ADMM	adaptive management measures
ADT	Average Daily Traffic
af	acre-feet
Alquist-Priolo Act	Alquist-Priolo Earthquake Fault Zoning Act
ALUC	Airport Land Use Commission
ALUCP	Airport Land Use Compatibility Plan
APNs	Assessor's Parcel Nos.
APP	avian protection plan
APWRA	Altamont Pass Wind Resource Area
ARB	ARB= Air Resources Board
ASTM	American Society of Testing and Materials
BAAQMD	Bay Area Air Quality Management District
Basin Plan	San Francisco Bay Basin Region
Bay Area 2010 CAP	Bay Area 2010 Climate Action Plan
BMPs	best management practices
BPS	best performance standards
C.F.R.	Code of Federal Regulations
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalFire	California Department of Forestry and Fire Protection
Cal-OSHA	California Division of Occupational Safety and Health
Caltrans	California Department of Transportation
CARB	California, the California Air Resources Board
CBSC	California Building Standards Code
CCAA	California Clean Air Act
CCAP	Community Climate Action Plan
CCAs	Community Choice Aggregators
CCR	California Code of Regulations

Term	Definition
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEC Guidelines	*California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development*
Center	California Raptor Center
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CGS	California Geological Survey
CH_4	methane
CHP	California Highway Patrol
CMA	Congestion Management Agency
CMP	Congestion Management Program
CNDDB	California Natural Diversity Database
CO	carbon monoxide
CO_2	Carbon Dioxide
CO_2e	carbon dioxide equivalent
COD	commercial operation date
County	Alameda County
CPUC	California Public Utilities commission
CRHR	California Register of Historical Resources
CTC	County Transportation Commission
CUP	Conditional Use Permit
CUPA	Certified Unified Program Agency
CVRWQCB	Central Valley Regional Water Quality Control Board
CWA	Clean Water Act
dB	decibels
dBA	A-weighted decibels
Delta	San Joaquin–Sacramento Delta
DFG	California Department of Fish and Game
DPM	diesel particulate matter
DPS	Distinct Population Segment
DTSC	Department of Toxic Substances Control
DWR	Department of Water Resources
EA	Environmental Analysis
EACCS	*East Alameda Conservation Strategy*
EBRPD	East Bay Regional Park District
ECAP	East County Area Plan
EO	executive order
EPA	U.S. Environmental Protection Agency
ESPs	energy service providers
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency

Term	Definition
FMMP	Farmland Mapping and Monitoring Program
General Industrial Permit, General Construction Permit	NPDES General Permit for Storm Water Discharges
GHG	greenhouse gas
Guidelines	*Land-Based Wind Energy Guidelines*
GVWR	gross vehicle weight rating
H&S	Health and Safety
HCD	California Department of Housing and Community Development
HDD	horizontal directional drilling
HFCs	Hydroflourocarbons
HI	hazard index [HI
HMBP	Hazardous Materials Business Plan
HRA	health risk assessment
I-580	Interstate 580
IBC	International Building Code
IOUs	investor-owned utilities
IPCC	Intergovernmental Panel on Climate Change
kV	kilovolts
LARPD	Livermore Area Recreation and Park District
LCFS	Low Carbon Fuel Standard
L_{dn}	day-night sound level
L_{eq}	equivalent sound level
LID	Low impact development
L_{max}	maximum sound level
LOS	level of service
LPA	Large Parcel Agriculture
Master Plan	East Bay Regional Park District Master Plan
mg/L	milligrams per liter
MRZ	Mineral Resource Zone
MTS	Metropolitan Transportation System
MW	megawatts
N_2O	nitrous oxide
N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NGOs	nongovernmental organizations
NHPA	National Historic Preservation Act
NO	nitric oxide
NOP	notice of preparation
NO_X	nitrogen oxides
NPDES	Pollutant Discharge Elimination System
NRHP	National Register of Historic Places

Term	Definition
NWIC	Northwest Information Center
O&M	Operations & Maintenance
Open Space Element	Open Space Element of the General Plan
Order No. 2009-0009-DWQ Construction General Permit	NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities
PCEs	Primary constituent elements
PEIR	Program EIR
PFCs	perfluorocarbons
PG&E	Pacific Gas and Electric Company
Phase I ESA	Phase I Environmental Site Assessment Process
PM10	particulate matter 10 microns or less in diameter
PM2.5	particulate matter 2.5 microns or less in diameter
Porter-Cologne Act	Porter-Cologne Water Quality Control Act of 1969
ppb	ppb = parts per billion
ppm	part per million
ppt	ppt = parts per trillion
PRC	Public Resources Code [PRC
PRDs	Permit Registration Documents
QA/QC	quality assurance/quality control
RCMP	Regional Congestion Management Program
RCRA	Resource Conservation and Recovery Act of 1976
Regional Water Boards	Regional Water Resources Control Boards
RHNA	Regional Housing Need Assessment
ROG	reactive organic gases [ROG]
RPS	Renewables Portfolio Standard
RWQCB	Regional Water Quality Control Board
Sand Hill	Sand Hill Wind LLC
SB	Senate Bill
Scenic Route Element	Scenic Route Element of the Alameda County General Plan
SEIR	subsequent EIR
SF_6	sulfur hexafluoride
SIP	State Implementation Plan
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SMARA	Surface Mining and Reclamation Act of 1975
SO_2	sulfur dioxide
SPCC	Spill Prevention Control and Countermeasures
SR	State Route
SRAs	state responsibility areas
State Water Board	State Water Resources Control Board
SVAB	San Joaquin Valley Air Basin
SVP	Society of Vertebrate Paleontology

Term	Definition
SWPPP	storm water pollution prevention plan
TAC	toxic air contaminant
TAC	technical advisory committee
Tanner Act	Toxic Air Contaminant Identification and Control Act
TCP	Traffic Control Plan
TDM	Transportation Demand Management
TDS	total dissolved solids
UCMP	University of California Museum of Paleontology
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
waters of the state	waters of the State of California
WDRs	waste discharge requirements
WSA	water supply assessment

Executive Summary

The County of Alameda (County) is preparing this Subsequent Environmental Impact Report (SEIR) to examine the environmental effects of the Sand Hill Wind Repowering Project (Project). The Project area is located within the Altamont Pass Wind Resource Area (APWRA) in eastern Alameda County. As required by Section 15123 of the State California Environmental Quality Act (CEQA) Guidelines, this Executive Summary contains the following sections.

- Project Overview
- Project Objectives
- Project Impacts and Mitigation Measures
- Project Alternatives
- Potential Areas of Controversy and Issues to be Resolved

This SEIR analyzes the environmental effects of the proposed Project, recommends measures to reduce or avoid potential environmental damage resulting from the Project, and identifies alternatives to the proposed Project. This SEIR also describes any significant environmental effects that cannot be avoided, growth-inducing effects, effects found not to be significant, and cumulative impacts.

Environmental review of the Project under CEQA began with the publication in September 2018 of an Environmental Analysis (EA) with supporting technical information intended to identify site-specific Project effects pursuant to Section 15168 of the CEQA Guidelines, providing for use of a Program EIR with later activities. The County had previously approved three wind repowering projects that had been tiered under similar documentation. However, after receiving comments on the EA in advance of a public hearing to consider approving the Project on such basis, the County decided to prepare this SEIR based on its determination that the current Project proposes turbines with characteristics sufficiently distinct from those described in the PEIR and is proposed in the context of new information that together support the decision to prepare a subsequent EIR. The requirements for a subsequent SEIR, under CEQA, are set out in State CEQA Guidelines Section 15162.

ES.1 Project Overview

Sand Hill Wind, LLC (Sand Hill) is proposing the Sand Hill Wind Repowering Project (Project) on 15 privately owned parcels in the Altamont Pass Wind Resource Area (APWRA). The proposed Project would entail installation of up to 40 new wind turbines and is expected to utilize turbines with generating capacities between 2.3 and 4.0 megawatts (MW) each, all generally similar in size and appearance, to develop up to 144.5 MW of generating capacity. The Project is proposed as a Conditional Use Permit (Alameda County Planning case PLN2017-00201) and is reviewed in this SEIR pursuant to the California Environmental Quality Act (CEQA) Guidelines, Section 15162, as a project tiered under the Altamont Pass Wind Resource Area Repowering Program EIR (PEIR), which the County of Alameda certified in December 2014.

ES.2 Project Objectives

The underlying purpose of the Project is to repower a large segment of the program area with a commercially viable wind energy facility that would be subject to a single, uniform avian monitoring protocol and help meet the state's Renewables Portfolio Standard (RPS), greenhouse gas (GHG) reduction, and carbon neutrality goals.

The fundamental objectives of the Project are as follows:

- To maximize wind energy production for Power Purchase Agreements obtained for the Project by siting up to forty new wind turbines on leased lands within the program area.
- To maintain commercial viability.

The secondary objectives of the Project are as follows:

- To minimize environmental impacts by:
  - Limiting ground disturbance through the re-use of existing infrastructure (e.g., roads, transmission lines) where feasible.
  - Improving understanding of the effects of new generation turbines on birds and bats by applying the same avian mortality monitoring protocol across a large segment of the program area, rather than separate protocols for multiple separate projects.
- To increase local short-term and long-term employment opportunities.
- To provide economic benefits to Alameda County.
- To assist California in meeting its RPS, GHG reduction, and carbon neutrality goals.

ES.3 Project Impacts and Mitigation Measures

This EIR discusses the project's potential environmental effects, and provides mitigation measures to reduce any significant impacts to less-than-significant levels, where feasible. Environmental topic areas and resources considered and dismissed from further evaluation are distinguished from those considered in detail in Chapter 1, *Introduction*. Sections 3.1 through 3.19 provide comprehensive discussions of the regulatory and environmental setting for the environmental resources affected by the project, and identify project impacts and mitigation measures designed to reduce significant impacts. Table ES-1, *Summary of Impacts and Mitigation Measures*, summarizes the impacts and mitigation measures identified for the Project.

ES.3.1 Summary of Project Impacts

The project impacts are summarized in Table ES-1 (presented at the end of this summary). For potentially significant impacts, mitigation measures are identified where feasible to reduce the impact on the environmental resources to a less-than-significant level. Chapter 3, *Impact Analysis*, provides a detailed discussion of impacts and mitigation measures for the proposed Project.

ES.3.2 Significant and Unavoidable Impacts

Section 15126.2(b) of the State CEQA Guidelines requires that the EIR describe any significant impacts, including those that can be mitigated but not reduced to less-than-significant levels. The following environmental impacts, also summarized in Table ES-1, were determined to be significant and unavoidable.

Biological Resources

Impact BIO-11: Avian mortality resulting from interaction with wind energy facilities

Impact BIO-14: Turbine-related fatalities of special-status and other bats

Impact BIO-19: Potential impact on the movement of any native resident or migratory wildlife species or established native resident or migratory wildlife corridors, and the use of native wildlife nursery sites

ES.4 Project Alternatives

Chapter 4, *Alternatives Analysis*, provides an evaluation of alternatives that would avoid or lessen significant effects of the project and that would feasibly attain the fundamental objective and most of the secondary project objectives. These alternatives are described below.

No Project – Repowering by Others

Under the No Project – Repowering by Others alternative, sPower would not repower the Project site. However, because of the site's unique wind resources, location within the Program Area, and proximity to existing transmission lines and substations, it is reasonable to expect, based on current plans and consistent with available infrastructure, that the project sites would be repowered in the foreseeable future by one or more wind companies, using turbines described in the PEIR and made subject to the same regulatory regime as other repowering proposals and achieving roughly the same MW production capacity. Any remaining turbine foundations would be removed as required by County regulations and policies, and road improvements and equipment laydown requirements would be assumed to be comparable to the Project.

No Project – No Repowering

Under the No Project – No Repowering alternative, no repowering would occur, and the project area would be restored to pre-permit conditions with restrictions against further installation of wind turbines on the Sand Hill project sites for the foreseeable future.

Smaller Turbine – Pre-Micro-Sited Layout

The Smaller Turbine – Pre-Micro-Sited Layout alternative, would involve the same number of turbines as the Project—up to 40—but would substitute the 35 proposed turbines of more than 3.0 MW in operating capacity (3.6-, 3.8- or potentially 4.0-MW-rated turbines) with moderately smaller, 2.8-MW turbines, and would micro-site all turbines at all feasible locations determined through two sequential micro-siting studies that were conducted with the objective of potentially reducing bat and avian impacts. Although the number of turbines within the leased project parcels would remain the same as the proposed project, the turbine locations would be different. In total, the Smaller Turbine – Pre-Micro-Sited alternative relocates 19 of the proposed Project's 40 turbines, reduces overall Project capacity by 24% from 144.5 MW to 109.5 MW, reduces rotor-swept area by 13%, from

568,775 m^2 to 496,220 m^2, and raises the average clearance of turbine blades by 75%, from 14.1 m to 24.7 m above the ground.

ES.5 Potential Areas of Controversy/Issues to be Resolved

The County previously issued an EA in September 2018 that provided public agencies and the public with a detailed Project description and an analysis of how the Project would fit within the scope of the PEIR and would not require either a subsequent or supplemental EIR. However, after careful consideration of the comments received regarding the EA, the County has elected to prepare this subsequent EIR (SEIR).

Areas of controversy were identified through written agency and public comments received during the project public review of the EA and are provided in Appendix A.

Commenters asserted that there is new information of potentially substantial importance that was not and could not have been known at the time the PEIR was completed. As a result, the commenters assert the Project will have more severe impacts on protected species of birds and bats than were anticipated in the PEIR, and therefore the CEQA analysis for the Project, as tiered from the PEIR, should identify different mitigation measures and alternatives that could reduce such effects.

The following issues were identified as areas of concern during scoping and are addressed in the appropriate sections of Chapter 3, *Impact Analysis*.

- Biological resources, especially Avian and Bat impacts
- Aesthetics (blade flicker and nighttime lighting) Setback requirements and how alternative minimum setbacks are appropriate with supporting studies of blade throw, noise or flicker studies, as needed
- Hazards and Hazardous Materials (blade throw)
- Noise (turbine noise).

ES.6 ~~How to~~ Comments on th~~is~~e Draft Subsequent EIR

The draft SEIR was released for public review from August 9, 2019 through 5:00 p.m. on October 4, 2019 and ~~This draft SEIR, incorporating public and agency responses to the Notice of Preparation (NOP), is being circulated for review and comment by appropriate~~circulated to state agencies, through the State Clearinghouse of the Governor's Office of Planning and Research~~as well as organizations and individuals who have requested notification~~. Comments on the draft SEIR were due no later than 5:00 p.m. October 4, 2019. ~~In accordance with Section 15205(d) of the State CEQA Guidelines, the County has scheduled a 45-day public review period for the draft EIR, ending at 5:00 p.m. on Friday, September 23, 2019. Within that 45-day period, the County will hold one public hearing to request comments on the draft EIR.~~

This draft SEIR ~~is~~was available for review and download at the Alameda County website (www.acgov. org/cda/planning, under Pending Land Use Projects, Current Development Projects and Wind Farm Projects; see Sand Hill Wind Project - Application No. PLN2017-00201). Copies ~~will~~were also ~~be~~ available for viewing during normal business hours (8:30 a.m. to 5:00 p.m.), Monday through Friday, at the Alameda County Community Development Agency, Planning Department, located at 224 West Winton Avenue, Room 111, Hayward, California, 94544.~~ Comments on the draft SEIR may be submitted to the Planning Department at that address, to the attention of Andrew Young, Senior Planner.~~

A public meeting was held at 1:30 p.m. on September 12, 2019, in the City of Pleasanton Council Chambers, 200 Old Bernal Avenue, Pleasanton. No comments on the draft SEIR were received during this meeting.

~~Following the close of the public review period for the draft SEIR, the County will consider the comments it receives. The County will prepare a final SEIR, incorporating all comments received during the public comment period, for consideration by the EBZA, tentatively scheduled for Thursday, October 10, 2019. As required by CEQA (Section 21092.5), the final SEIR, including written responses to the comments submitted by public agencies, will be available at least 10 days prior to certification.~~

Table ES-1. Summary of Impacts and Mitigation Measures

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
Aesthetics			
Impact AES-1: Potential to have a substantial adverse effect on a scenic vista	S	PEIR Mitigation Measure AES-1: Limit construction to daylight hours 2019 Updated PEIR Mitigation Measure AES-2a: Require site development review PEIR Mitigation Measure AES-2b: Maintain site free of debris and restore abandoned roadways PEIR Mitigation Measure AES-2c: Screen surplus parts and materials	LTS
Impact AES-2: Potential to substantially damage scenic resources along a scenic highway	S	2019 Updated PEIR Mitigation Measure AES-2a: Require site development review PEIR Mitigation Measure AES-2b: Maintain site free of debris and restore abandoned roadways PEIR Mitigation Measure AES-2c: Screen surplus parts and materials	LTS
Impact AES-3: In non-urbanized areas, degradation of the existing visual character or quality of public views of the site and its surroundings; in urbanized areas, conflict with zoning or other regulations governing scenic quality	S	2019 Updated PEIR Mitigation Measure AES-2a: Require site development review PEIR Mitigation Measure AES-2b: Maintain site free of debris and restore abandoned roadways PEIR Mitigation Measure AES-2c: Screen surplus parts and materials	LTS
Impact AES-4: Introduction of a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area	S	2019 Updated PEIR Mitigation Measure AES-2a: Require site development review PEIR Mitigation Measure AES-5: Analyze shadow flicker distance and mitigate effects or incorporate changes into Project design to address shadow flicker	LTS

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
Agricultural and Forestry Resources			
Impact AG-1: Conversion of Important Farmland to nonagricultural use	NI		
Impact AG-2: Conflict with existing zoning for agricultural use or with a Williamson Act contract	NI		
Impact AG-3: Conflict with existing zoning of forest land, timberland, or timberland zoned Timberland Production	NI		
Impact AG-4: Loss of forest land or conversion of forest land to non-forest use	NI		
Impact AG-5: Potential to cause changes in the existing environment that could result in conversion of Farmland to nonagricultural use or conversion of forest land to non-forest use	NI		
Air Quality			
Impact AQ-1: Conflict with or obstruction of implementation of the applicable air quality plan	LTS		
Impact AQ-2: Cumulatively considerable net increase of any criteria pollutant for which the Project region is a nonattainment area for an applicable federal or state ambient air quality standard	Construction: S Operation: LTS	PEIR Mitigation Measure AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures PEIR Mitigation Measure AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures 2019 NEW Mitigation Measure AQ-2c: Reduce construction-related air pollutant emissions to below BAAQMD NO_x thresholds	Construction: LTS

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
Impact AQ-3: Exposure of sensitive receptors to substantial pollutant concentrations	S	PEIR Mitigation Measure AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures PEIR Mitigation Measure AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures 2019 NEW Mitigation Measure AQ-2c: Reduce construction-related air pollutant emissions to below BAAQMD NO_x thresholds	LTS
Impact AQ-4: Generation of objectionable odors adversely affecting a substantial number of people	LTS		
Biological Resources			
Impact BIO-1: Potential for ground-disturbing activities to result in adverse effects on special-status plants or habitat occupied by special-status plants	S	PEIR Mitigation Measure BIO-1a: Conduct surveys to determine the presence or absence of special-status plant species 2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species PEIR Mitigation Measure BIO-1c: Avoid and minimize impacts on special-status plant species by establishing activity exclusion zones PEIR Mitigation Measure BIO-1d: Compensate for impacts on special-status plant species PEIR Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas	LTS
Impact BIO-2: Adverse effects on special-status plants and natural communities resulting from the introduction and spread of invasive plant species	S	2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species PEIR Mitigation Measure BIO-2: Prevent introduction, spread, and establishment of invasive plant species PEIR Mitigation Measure BIO-5c: Restore disturbed annual grasslands PEIR Mitigation Measure WQ-1: Comply with NPDES requirements	LTS

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
Impact BIO-3: Potential mortality or loss of habitat for vernal pool branchiopods and curved-foot hygrotus diving beetle	S	2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species PEIR Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas PEIR Mitigation Measure BIO-3b: Implement measures to avoid, minimize, and mitigate impacts on vernal pool branchiopods and curved-footed hygrotus diving beetle	LTS
Impact BIO-4: Potential disturbance or mortality of and loss of suitable habitat for valley elderberry longhorn beetle	NI		
Impact BIO-5: Potential disturbance or mortality of and loss of suitable habitat for California tiger salamander, western spadefoot, California red-legged frog, and foothill yellow-legged frog	S	2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species PEIR Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas 2019 Updated PEIR Mitigation Measure BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians PEIR Mitigation Measure BIO-5b: Compensate for loss of habitat for special-status amphibians PEIR Mitigation Measure BIO-5c: Restore disturbed annual grasslands	LTS

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
Impact BIO-6: Potential disturbance or mortality of and loss of suitable habitat for western pond turtle	S	2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species PEIR Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas PEIR Mitigation Measure BIO-6: Conduct preconstruction surveys for western pond turtle and monitor construction activities if turtles are observed	LTS
Impact BIO-7: Potential disturbance or mortality of and loss of suitable habitat for Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip	S	2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species PEIR Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas PEIR Mitigation Measure BIO-5c: Restore disturbed annual grasslands PEIR Mitigation Measure BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles	LTS
Impact BIO-8: Potential construction-related disturbance or mortality of special-status and non–special-status migratory birds	S	2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species PEIR Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas PEIR Mitigation Measure BIO-5c: Restore disturbed annual grasslands 2019 Updated PEIR Mitigation Measure BIO-8a: Implement measures to avoid and minimize potential impacts on special-status and non–special-status nesting birds PEIR Mitigation Measure BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl	LTS

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
Impact BIO-9: Permanent and temporary loss of occupied habitat for western burrowing owl and foraging habitat for tricolored blackbird and other special-status and non–special-status birds	S	2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species PEIR Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas PEIR Mitigation Measure BIO-5c: Restore disturbed annual grasslands PEIR Mitigation Measure BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl PEIR Mitigation Measure BIO-9: Compensate for the permanent loss of occupied habitat for western burrowing owl	LTS
Impact BIO-10: Potential injury or mortality of and loss of habitat for San Joaquin kit fox and American badger	S	2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species PEIR Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas PEIR Mitigation Measure BIO-5c: Restore disturbed annual grasslands PEIR Mitigation Measure BIO-10a: Implement measures to avoid and minimize potential impacts on San Joaquin kit fox and American badger PEIR Mitigation Measure BIO-10b: Compensate for loss of suitable habitat for San Joaquin kit fox and American badger	LTS

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
Impact BIO-11: Avian mortality resulting from interaction with wind energy facilities	S	PEIR Mitigation Measure BIO-11a: Prepare a Project-specific avian protection plan PEIR Mitigation Measure BIO-11b: Site turbines to minimize potential mortality of birds PEIR Mitigation Measure BIO-11c: Use turbine designs that reduce avian impacts PEIR Mitigation Measure BIO-11d: Incorporate avian-safe practices into design of turbine-related infrastructure PEIR Mitigation Measure BIO-11e: Retrofit existing infrastructure to minimize risk to raptors PEIR Mitigation Measure BIO-11f: Discourage prey for raptors PEIR Mitigation Measure BIO-11g: Implement postconstruction avian fatality monitoring for all repowering projects Updated 2019 PEIR Mitigation Measure BIO-11h: Compensate for the loss of raptors and other avian species, including golden eagles, by contributing to conservation efforts PEIR Mitigation Measure BIO-11i: Implement an avian adaptive management program	SU
Impact BIO-12: Potential mortality or disturbance of bats from roost removal or disturbance	S	2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species PEIR Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species PEIR Mitigation Measure BIO-12a: Conduct bat roost surveys PEIR Mitigation Measure BIO-12b: Avoid removing or disturbing bat roosts	LTS
Impact BIO-13: Potential for construction activities to temporarily remove or alter bat foraging habitat	LTS		

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
Impact BIO-14: Turbine-related fatalities of special-status and other bats	S	PEIR Mitigation Measure BIO-14a: Site and select turbines to minimize potential mortality of bats 2019 Updated PEIR Mitigation Measure BIO-14b: Implement postconstruction bat fatality monitoring program for all repowering projects PEIR Mitigation Measure BIO-14c: Prepare and publish annual monitoring reports on the findings of bat use of the Project area and fatality monitoring results PEIR Mitigation Measure BIO-14d: Develop and implement a bat adaptive management plan PEIR Mitigation Measure BIO-14e: Compensate for expenses incurred by rehabilitating injured bats	SU
Impact BIO-15: Potential for road infrastructure upgrades and installation of electrical collection lines to result in adverse effects on alkali wetlands/drainages	S	2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species PEIR Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas 2019 Updated PEIR Mitigation Measure BIO-15: Compensate for the loss of alkali wetland/drainage habitat	LTS
Impact BIO-16: Potential for road infrastructure upgrades to result in adverse effects on riparian habitat	NI		
Impact BIO-17: Potential for ground-disturbing activities to result in direct adverse effects on common habitats	LTS		

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
Impact BIO-18: Potential for road infrastructure upgrades to result in adverse effects on wetlands and drainages	S	2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species PEIR Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas 2019 Updated PEIR Mitigation Measure BIO-18: Compensate for the loss of wetlands and non-wetland waters	LTS
Impact BIO-19: Potential impact on the movement of any native resident or migratory wildlife species or established native resident or migratory wildlife corridors, and the use of native wildlife nursery sites	S	2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species PEIR Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas PEIR Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species 2019 Updated PEIR Mitigation Measure BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians PEIR Mitigation Measure BIO-5c: Restore disturbed annual grasslands PEIR Mitigation Measure BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles 2019 Updated PEIR Mitigation Measure BIO-8a: Implement measures to avoid and minimize potential impacts on special-status and non–special-status nesting birds PEIR Mitigation Measure BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl PEIR Mitigation Measure BIO-10a: Implement measures to avoid and minimize potential impacts on San Joaquin kit fox and American badger	SU

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		PEIR Mitigation Measure BIO-11b: Site turbines to minimize potential mortality of birds PEIR Mitigation Measure BIO-11c: Use turbine designs that reduce avian impacts PEIR Mitigation Measure BIO-11d: Incorporate avian-safe practices into design of turbine-related infrastructure PEIR Mitigation Measure BIO-11e: Retrofit existing infrastructure to minimize risk to raptors PEIR Mitigation Measure BIO-11i: Implement an avian adaptive management program PEIR Mitigation Measure BIO-12a: Conduct bat roost surveys PEIR Mitigation Measure BIO-12b: Avoid removing or disturbing bat roosts PEIR Mitigation Measure BIO-14a: Site and select turbines to minimize potential mortality of bats PEIR Mitigation Measure BIO-14d: Develop and implement a bat adaptive management plan	
Impact BIO-20: Conflict with local plans or policies	S	PEIR Mitigation Measure BIO-1a: Conduct surveys to determine the presence or absence of special-status species 2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species PEIR Mitigation Measure BIO-1c: Avoid and minimize impacts on special-status plant species by establishing activity exclusion zones PEIR Mitigation Measure BIO-1d: Compensate for impacts on special-status plant species PEIR Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas PEIR Mitigation Measure BIO-2: Prevent introduction, spread, and establishment of invasive plant species	LTS

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		PEIR Mitigation Measure BIO-3a: Implement measures to avoid, minimize, and mitigate impacts on vernal pool branchiopods and curved-footed hygrotus diving beetle 2019 Updated PEIR Mitigation Measure BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians PEIR Mitigation Measure BIO-5b: Compensate for loss of habitat for special-status amphibians PEIR Mitigation Measure BIO-5c: Restore disturbed annual grasslands PEIR Mitigation Measure BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles 2019 Updated PEIR Mitigation Measure BIO-8a: Implement measures to avoid and minimize potential impacts on special-status and non-special-status nesting birds PEIR Mitigation Measure BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl PEIR Mitigation Measure BIO-9: Compensate for the permanent loss of foraging habitat for western burrowing owl PEIR Mitigation Measure BIO-10a: Implement measures to avoid and minimize potential impacts on San Joaquin kit fox and American badger PEIR Mitigation Measure BIO-10b: Compensate for loss of suitable habitat for San Joaquin kit fox and American badger PEIR Mitigation Measure BIO-11a: Prepare a Project-specific avian protection plan PEIR Mitigation Measure BIO-11b: Site turbines to minimize potential mortality of birds PEIR Mitigation Measure BIO-11c: Use turbine designs that reduce avian impacts PEIR Mitigation Measure BIO-11d: Incorporate avian-safe practices into design of turbine-related infrastructure	

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
		PEIR Mitigation Measure BIO-11e: Retrofit existing infrastructure to minimize risk to raptors PEIR Mitigation Measure BIO-11f: Discourage prey for raptors PEIR Mitigation Measure BIO-11g: Implement postconstruction avian fatality monitoring for all repowering projects 2019 Updated PEIR Mitigation Measure BIO-11h: Compensate for the loss of raptors and other avian species, including golden eagles, by contributing to conservation efforts PEIR Mitigation Measure BIO-11i: Implement an avian adaptive management program PEIR Mitigation Measure BIO-12a: Conduct bat roost surveys PEIR Mitigation Measure BIO-12b: Avoid removing or disturbing bat roosts PEIR Mitigation Measure BIO-14a: Site and select turbines to minimize potential mortality of bats PEIR Mitigation Measure BIO-14d: Develop and implement a bat adaptive management plan 2019 Updated PEIR Mitigation Measure BIO-15: Compensate for the loss of alkali wetland/drainage habitat 2019 Updated PEIR Mitigation Measure BIO-18: Compensate for the loss of wetlands and non-wetland waters	
Impact BIO-21: Conflict with provisions of an adopted HCP/NCCP or other approved local, regional, or state habitat conservation plan	NI		

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
Cultural Resources			
Impact CUL-1: Potential to cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5	NI		
Impact CUL-2: Potential to cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5	S	PEIR Mitigation Measure CUL-2c: Conduct worker awareness training for archaeological resources prior to construction PEIR Mitigation Measure CUL-2d: Stop work if cultural resources are encountered during ground-disturbing activities	LTS
Impact CUL-3: Disturbance of any human remains, including those interred outside of dedicated cemeteries	S	PEIR Mitigation Measure CUL-3: Stop work if human remains are encountered during ground-disturbing activities	LTS
Energy			
Impact EN-1: Wasteful, inefficient, or unnecessary consumption of energy resources during Project construction or operation	S	PEIR Mitigation Measure AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures PEIR Mitigation Measure AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation 2019 NEW Mitigation Measure AQ-2c: Reduce construction-related air pollutant emissions to below BAAQMD NO_x thresholds	LTS
Impact EN-2: Conflict with or obstruction of a state or local plan for renewable energy or energy efficiency	NI		
Geology, Soils, Mineral Resources, and Paleontological Resources			
Impact GEO-1: Potential substantial adverse effects involving rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, including liquefaction, or landslides	S	PEIR Mitigation Measure GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS
Impact GEO-2: Potential to result in substantial soil erosion or the loss of topsoil	LTS		

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
Impact GEO-3: Placement of Project-related facilities on a geologic unit or soil that is unstable or that would become unstable as a result of the Project and potentially result in an onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse	S	PEIR Mitigation Measure GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS
Impact GEO-4: Placement of Project-related facilities on expansive soil, creating substantial direct or indirect risks to life or property	S	PEIR Mitigation Measure GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report	LTS
Impact GEO-5: Direct or indirect destruction of a unique paleontological resource or site or unique geologic feature	S	PEIR Mitigation Measure GEO-7a: Retain a qualified professional paleontologist to monitor significant ground-disturbing activities PEIR Mitigation Measure GEO-7b: Educate construction personnel in recognizing fossil material PEIR Mitigation Measure GEO-7c: Stop work if substantial fossil remains are encountered during construction	LTS
Greenhouse Gas Emissions			
Impact GHG-1: Generation of greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment	LTS		
Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases	S	2019 Updated PEIR Mitigation Measure GHG-2a: Implement best available control technology for heavy-duty vehicles PEIR Mitigation Measure GHG-2b: Install low SF6 leak rate circuit breakers and monitoring PEIR Mitigation Measure GHG-2c: Require new construction to use building materials containing recycled content PEIR Mitigation Measure GHG-2d: Comply with construction and demolition debris management ordinance	LTS

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
Hazards and Hazardous Materials			
Impact HAZ-1: Creation of a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials	LTS		
Impact HAZ-2: Creation of a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment	LTS		
Impact HAZ-3: Emission of hazardous emissions or handling of hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school	NI		
Impact HAZ-4: Placement of Project-related facilities on a site that is included on a list of hazardous materials sites, and resulting creation of a significant hazard to the public or the environment	S	2019 Updated PEIR Mitigation Measure HAZ-4: Perform a Phase I Environmental Site Assessment prior to construction activities and remediate if necessary	LTS
Impact HAZ-5: Placement of Project-related facilities within an airport land use plan area or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, resulting in a safety hazard or excessive noise for people residing or working in the Project area	LTS		
Impact HAZ-6: Impairment of implementation of or physical interference with an adopted emergency response plan or emergency evacuation plan	S	PEIR Mitigation Measure TRA-1: Develop and implement a construction traffic control plan	LTS
Impact HAZ-7: Exposure of people or structures, either directly or indirectly, to a significant risk involving wildland fires	LTS		
Impact HAZ-8: During normal operation, the effects of bending and stress on rotor blades over time could lead to blade failure and become a potential blade throw hazard	S	2019 NEW Mitigation Measure HAZ-8: Site Turbines at least 1.25 times TTH from Public Roads and Prepare a Blade Throw Study if Necessary	LTS

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
Hydrology and Water Quality			
Impact WQ-1: Violation of any water quality standards or waste discharge requirements or other degradation of surface water or groundwater quality	S	PEIR Mitigation Measure WQ-1: Comply with NPDES requirements	LTS
Impact WQ-2: Substantial decrease of groundwater supplies or substantial interference with groundwater recharge such that the Project may impede sustainable groundwater management of the basin	LTS		
Impact WQ-3: Substantial alteration of existing drainage patterns in a manner that would result in substantial erosion or siltation onsite or offsite	S	PEIR Mitigation Measure WQ-1: Comply with NPDES requirements	LTS
Impact WQ-4: Substantial increase in the amount of surface runoff in a manner that would result in flooding onsite or offsite	S	PEIR Mitigation Measure WQ-1: Comply with NPDES requirements	LTS
Impact WQ-5: Creation of or contribution to runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff	S	PEIR Mitigation Measure WQ-1: Comply with NPDES requirements	LTS
Impact WQ-6: Obstruction or redirection of flood flows caused by drainage modifications	NI		
Impact WQ-7: In flood hazard, tsunami, or seiche zones, risk of release of pollutants as a result of Project inundation	S	PEIR Mitigation Measure WQ-1: Comply with NPDES requirements	LTS
Impact WQ-8: Conflict with or obstruction of implementation of a water quality control plan or sustainable groundwater management plan	S	PEIR Mitigation Measure WQ-1: Comply with NPDES requirements	LTS
Land Use and Planning			
Impact LU-1: Physical division of an established community	NI		
Impact LU-2: Conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect	NI		

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
Noise			
Impact NOI-1: Generation of increased ambient noise levels in the Project vicinity in excess of applicable standards	S	PEIR Mitigation Measure NOI-2: Employ noise-reducing practices during decommissioning and new turbine construction PEIR Mitigation Measure NOI-1: Perform project-specific noise studies and implement measures to comply with County noise standards	LTS
Impact NOI-2: Generation of excessive groundborne vibration or groundborne noise levels	LTS		
Impact NOI-3: Placement of Project-related activities in the vicinity of a private airstrip or an airport land use plan or within 2 miles of a public airport or public use airport, resulting in exposure of people residing or working in the Project area to excessive noise levels	NI		
Population and Housing			
Impact POP-1: Creation of substantial population growth either directly or indirectly	NI		
Impact POP-2: Displacement of a substantial number of existing people or housing, necessitating the construction of replacement housing elsewhere	NI		
Public Services			
Impact PS-1: Creation of a need for new or physically altered governmental facilities to maintain acceptable service ratios, response times, or other performance objectives for fire protection, police protection, schools, parks, of other public facilities	NI		

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
Recreation			
Impact REC-1: Increased use of existing recreational facilities, resulting in substantial physical deterioration	NI		
Impact REC-2: Construction or expansion of recreational facilities that might have an adverse physical effect on the environment	NI		
Transportation			
Impact TRA-1: Conflict with a program, plan, ordinance, or policy addressing the circulation system including transit, roadway, bicycle, and pedestrian facilities	S	PEIR Mitigation Measure TRA-1: Develop and implement a construction traffic control plan	LTS
Impact TRA-2: Conflict or be inconsistent with State CEQA Guidelines Section 15064.3, subdivision (b)	NI		
Impact TRA-3: Substantial increase in hazards because of a geometric design feature (e.g., sharp curves, dangerous intersections) or incompatible uses (e.g., farm equipment)	S	PEIR Mitigation Measure TRA-1: Develop and implement a construction traffic control plan	LTS
Impact TRA-4: Potential to cause inadequate emergency access	S	PEIR Mitigation Measure TRA-1: Develop and implement a construction traffic control plan	LTS
Tribal Cultural Resources			
Impact TCR-1: Potential to cause a substantial adverse change in the significance of a tribal cultural resource with cultural value to a California Native American tribe and that is listed or eligible for listing in the California Register of Historical Resources or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k)	LTS		
Impact TCR-2: Potential to cause a substantial adverse change in the significance of a tribal cultural resource with cultural value to a California Native American tribe and that is a resource determined by the lead agency to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1.	LTS		

Impact	Level of Significance	Mitigation Measure	Significance after Mitigation
Utilities and Service Systems			
Impact UT-1: Relocation or construction of new or expanded water, wastewater treatment, stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction of which could cause significant environmental effects	LTS		
Impact UT-2: Have sufficient water supply to serve the Project and reasonably foreseeable future development during normal, dry, and multiple dry years	LTS		
Impact UT-3: Project-related exceedance of existing wastewater treatment capacity	NI		
Impact UT-4: Project-related exceedance of state or local solid waste standards or of the capacity of local infrastructure, or other impediments to attaining solid waste reduction goals	LTS		
Impact UT-5: Inconsistency with federal, state, and local management and reduction statutes and regulations related to solid waste	NI		
Wildfire			
Impact WF-1: Substantial impairment of an adopted emergency response plan or emergency evacuation plan	S	PEIR Mitigation Measure TRA-1: Develop and implement a construction traffic control plan	LTS
Impact WF-2: Exacerbation of wildfire risks associated with pollutant concentrations or uncontrolled spread of wildfire	LTS		
Impact WF-3: Project-related installation or maintenance of associated infrastructure that may exacerbate fire risk or result in temporary or ongoing environmental impacts	LTS		
Impact WF-4: Exposure of people or structures to significant risks such as downslope or downstream flooding or landslide as a result of runoff, post-fire slope instability, or drainage changes	LTS		

SU = significant and unavoidable; S = significant; LTS = less than significant; NI = no impact.

Chapter 1
Introduction and Scope of Subsequent Environmental Impact Report

1.1 Project Overview

Sand Hill Wind, LLC (Sand Hill), an entity owned by sPower, an AES and AIMCo company, is proposing the Sand Hill Wind Repowering Project (Project) on 15 privately owned parcels in the Altamont Pass Wind Resource Area (APWRA) (Figure 1-1). Although the parcels are not fully contiguous, they are collectively referred to herein as the Project site, and extend over approximately 2,600 acres. The proposed Project would entail installation of up to 40 new wind turbines and is expected to utilize turbines with generating capacities between 2.3 and 4.0 megawatts (MW) each, all generally similar in size and appearance, to develop up to 144.5 MW of generating capacity. The Project is proposed as a Conditional Use Permit (Alameda County Planning case PLN2017-00201) and is reviewed in this Subsequent Environmental Impact Report (SEIR) pursuant to the California Environmental Quality Act (CEQA) Guidelines, Section 15162, as a project tiered under the Altamont Pass Wind Resource Area Repowering Program EIR (PEIR), which the County of Alameda (County) certified in November 2014.

1.2 Background

The APWRA was designated by the state of California as a wind resource area over large areas of Alameda and Contra Costa Counties during the late 1970s. The APWRA was developed with several thousand wind turbines by the mid-1990s and was operated by several different companies under various Conditional Use Permits (CUPs). In 1998, after many reports of birds being killed in blade strikes were documented, and research began to be developed on how repowering could reduce bird deaths and improve reliability, the two Counties cooperated in preparing a Program EIR and setting guidelines for future projects. Repowering is the replacement of older generation wind turbines with new turbines, technology, and infrastructure, with goals that include greater efficiency, reduced maintenance costs, and lowering avian mortality. However, for various reasons, only one repowering project was approved in Alameda County on the basis of the 1998 Program EIR, the Diablo Winds project, which began operating in 2005.

Most of the CUPs for the “wind farm” operations of older generation turbines in Alameda County were set to expire from 2001 to 2003. In 2005, the County extended use of those turbines through 2018 under 31 CUPs, with a requirement that phased repowering occur during the terms of the CUPs. The County also required preparation of the PEIR to evaluate the potential environmental impacts of such repowering and to identify appropriate mitigation measures to address significant impacts of repowering.

As required by the County’s permit extensions in 2005, and pursuant to State CEQA Guidelines Section 15168, the PEIR was prepared, and it was certified on November 12, 2014. The PEIR represented a program-level evaluation of the planned repowering of the APWRA, with focused attention on two program alternatives of total buildout or complete repowering, either 417 MW (Alternative 1, based on the peak level of production capacity in Alameda County as of 1998, when repowering was first proposed and evaluated under the previous Program EIR) or 450 MW (Alternative 2, based on a modest increase of less than 10% in energy production over Alternative 1). The PEIR also incorporated project-level evaluation of two proposed repowering projects, the Golden Hills Wind Project proposed by NextEra Energy Resources and the Patterson Pass Project proposed by EDF Renewable Energy. Both of these projects were approved at the time the PEIR was certified.

In 2013, prior to certification of the PEIR, Ogin Inc., through its subsidiary Sand Hill Wind, Inc., applied for a permit to repower six of the current Project site parcels and another pair of parcels now outside the current Project boundaries containing 433 wind turbines and turbine sites with Ogin's experimental "shrouded turbine" design, which would have resulted in 40 new turbines with a combined capacity of 4 MW (Planning application PLN2013-00013). This project was approved in March 2014 with CEQA review in a separate project EIR but was not implemented and is now expired. Following that project review, another proposal for the Sand Hill project (application PLN2015-00198), as a different project proposal on the same eight parcels, proposed repowering the same 433 wind turbines or turbine sites, and would have resulted in up to 12 new turbines with a maximum capacity of 36 MW. The CEQA review of this 2015 prior Sand Hill Wind project was tiered under the PEIR after the certification of the PEIR. However, sPower, which acquired that application from Ogin, Inc. along with leases for wind energy development and repowering on the Project site, does not intend to repower turbines under that application.

Separately, two other wind repowering projects were approved as consistent with and tiered under the PEIR since its original certification in 2014: the Golden Hills North project proposed by NextEra Energy Resources and the Summit Wind project proposed by AWI (now owned by Salka Energy).

Environmental review of the Project under CEQA began with the publication in September 2018 of an Environmental Analysis (EA) with supporting technical information intended to identify site-specific Project effects pursuant to Section 15168 of the CEQA Guidelines, which provides for the use of a Program EIR with later activities through tiering. After receiving comments on the EA in advance of a public hearing to consider approving the Project on such basis, however, the County determined that the current Project proposes turbines with characteristics sufficiently distinct from those described in the PEIR and is proposed in the context of new information, that together support the decision to prepare a subsequent EIR. Primarily, the Sand Hill Project is proposed with turbines with a nameplate capacity of 3.6 or 3.8 MW, or potentially up to 4.0 MW if they become available, and therefore with 20 to 33 percent more MW yield per turbine than the 3.0 MW turbines used in the PEIR to estimate program-level environmental impacts of a typical individual future repowering project. Additionally, the dimensions of the larger-yield turbines will also be physically increased, with roughly 7% longer rotor blades, 9% additional diameter, and a resulting 20% expansion of rotor swept area.

However, because the PEIR estimated bird and bat mortality for potential buildout of the APWRA repowering process and individual projects on the basis of MWs (e.g., 2.43 combined raptor deaths per MW per year under baseline non-repowered conditions, or a MW-mortality metric or ratio), the physical form or configuration of individual turbines within a project is not as important as the MW total in estimating or comparing project impacts with the buildout of the APWRA under its program alternatives (417 or 450 MW total). Nonetheless, based on the proposed Sand Hill Wind Project's site of 2,600 acres and the use of MW-mortality metrics as in the PEIR, separately from the potentially longer rotor blades or other physical distinctions, the difference between the Project proposal for higher MW capacity turbines and turbine capacities described in detail in the PEIR, assumed to

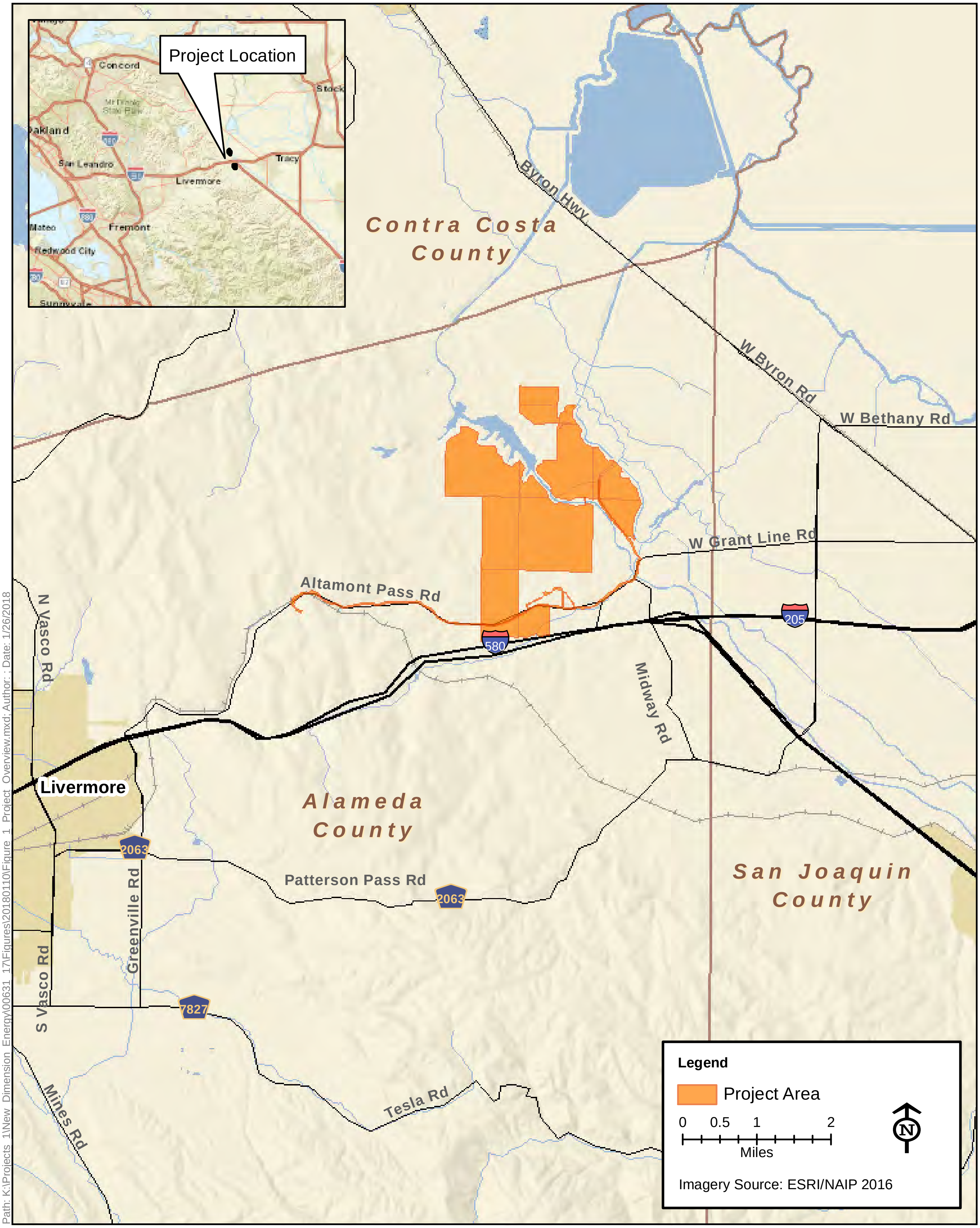

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Figure 1-1
Project Location

be no more than 3.0 MWs per turbine, is sufficient to support the decision to prepare the SEIR. The specific changes in physical features are described in subsequent sections and in detail in Chapter 2.

1.3 CEQA Guidelines Applicable to Subsequent EIRs

State CEQA Guidelines Section 15162provides the following guidance:

15162. SUBSEQUENT EIRS AND NEGATIVE DECLARATIONS

(a) When an EIR has been certified or a negative declaration adopted for a project, no subsequent EIR shall be prepared for that project unless the lead agency determines, on the basis of substantial evidence in the light of the whole record, one or more of the following:

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

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

(3) New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete or the Negative Declaration was adopted, shows any of the following:

(A) The project will have one or more significant effects not discussed in the previous EIR or negative declaration;

(B) Significant effects previously examined will be substantially more severe than shown in the previous EIR;

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

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

Section 15162(d) provides:

(d) A subsequent EIR or subsequent negative declaration shall be given the same notice and public review as required under Section 15087 or Section 15072. A subsequent EIR or negative declaration shall state where the previous document is available and can be reviewed.

An EIR, including an SEIR, is a public informational document used in the planning and decision-making process. Although the EIR does not control the ultimate decision on the project, the lead agency must consider the information in the EIR and respond to each significant impact identified in the EIR.

1.4 Evaluation of Need for Subsequent EIR

Section 15168 of the State CEQA Guidelines provides for a Program EIR to be used for a series of actions that are characterized as one large project, related geographically, logically, or as individual activities carried out under the same authority with generally similar environmental effects that can be mitigated in similar ways. The overall repowering of the APWRA within Alameda County was, therefore, appropriately evaluated in the PEIR. CEQA Guidelines Section 15168(b) lists the advantages of a Program EIR as allowing the lead agency to consider broad policy alternatives and program-wide mitigation measures at an early time, when the agency has greater flexibility to deal with basic problems or cumulative impacts. On this basis, the County is able to apply consistent and similar mitigation measures to each repowering project that may be proposed until repowering is considered complete. Additionally, Section 15152 of the Guidelines describes the use and advantages of tiering, wherein the analysis of general matters contained in a broader EIR (including a Program EIR pursuant to Section 15152[h]) is used with later EIRs and negative declarations on narrower projects, incorporating by reference the general discussions from the prior, broader EIR and concentrating the later CEQA analysis solely on the issues specific to the later project.

As set forth in Section 15168(d), a Program EIR can be used to simplify the task of preparing environmental documents on later parts of the program (such as a repowering project not evaluated at a project level in the PEIR), and to provide a basis within an Initial Study to determine if the later activity would have significant effects that were not recognized in the Program EIR. Since the PEIR was certified in 2014, three other repowering projects have been evaluated at a project level with environmental checklists or an initial study, specifically a second Next Era project (Golden Hills North), the Summit Wind Energy Project approved for development by AWI in 2016 (currently owned by Salka Wind), and a different proposal for repowering a portion of the Project site by Sand Hill Wind, LLC when its assets were owned by Ogin, Inc.

The County previously issued an EA in September 2018 that provided public agencies and the public with a detailed Project description, an analysis of how the Project would fit within the scope of the PEIR, and an explanation of how the Project would not require either a subsequent or supplemental EIR. The EA and checklist also provided a detailed description of the environmental impacts of the Project and identified the mitigation measures that would be required to be implemented. All of the impacts and mitigation measures in the EA had previously been identified in the PEIR.

In the EA, the County stated that the Project did not represent substantial changes to the project or program described in the PEIR that would require a subsequent or supplemental EIR. The County further held that no new significant effects would result, that the severity of identified impacts would not change, and that no new information existed that could not have been known at the time the PEIR was certified showing that new mitigation measures or alternatives existed that would reduce the significant effects of the Project. However, after careful consideration of the comments received regarding the EA, the County has determined that, in the interest of the overall purpose of CEQA to inform decision makers and the public about potential, significant environmental effects of projects and identify mitigation measures and alternatives to avoid or reduce those effects, a decision to prepare this SEIR is warranted. The County determined that the SEIR would be the CEQA document best suited to address comments on the EA, review the Project and its impacts in more detail, acknowledge updated reports regarding avian and bat mortality, and provide updates to information presented in the PEIR since its approval in 2014.

Additionally, none of the comment letters suggest that a new EIR other than a subsequent EIR tiered from the PEIR is necessary, thereby acknowledging in part that the current Project is reasonably within the scope of projects anticipated in the PEIR. Furthermore, based on the EA, the implementation checklist, and the reasons stated below, the County has elected to prepare this Subsequent EIR based on the distinctive features of the proposed larger turbines, in the context of new information, and as a means of addressing commenter concerns and lessons learned from implementation of the PEIR since its approval in 2014.

Commenters argued that the Project would have more severe impacts on protected species of birds and bats than were anticipated in the PEIR, and, therefore, the CEQA analysis for the Project, as tiered from the PEIR, requires more site-specific analysis of the Project impacts and consideration of additional alternatives and mitigation measures that were not identified in the PEIR. Although each of the comment letters on the EA asserted, with some variation, that the Project as currently proposed (with larger turbines and Project area and greater MW capacity) was not specifically analyzed in the PEIR and is thus not in the scope of the PEIR, the County considers the Project, as previously explained in the EA and checklist, to be a wind repowering project within the program area defined for the PEIR, and as generally described by the PEIR and within its scope.

The County took numerous aspects of the current Project proposal and determinations in the PEIR into consideration in assessing the need for a subsequent EIR, related to each of the three conditions in Section 15162 of the CEQA Guidelines, as described below.

1. *Changes in the Project:* As stated above and in the EA, the Sand Hill Wind Project is proposed with differences from the features of the projects anticipated in the PEIR, including the proposed use of turbines with a nameplate capacity of 3.6 or 3.8 MW, or potentially up to 4.0 MW if such turbines become available. These turbines would thus have 20 to 25% greater output than would the 3.0 MW-turbines described in the PEIR as the largest anticipated turbines that would be used in the repowering of the APWRA. If a 4.0 MW model becomes available, the Project's turbines would be up to 33% larger than anticipated in the PEIR. The additional output would be substantially greater due to the use of longer rotor blades (by approximately 15 feet and roughly 7.5%), which would result in a typical rotor swept area of 158,671 square feet. The rotor swept area described in the PEIR of the largest capacity turbine (3.0 MW) was 131,955 square feet. Consequently, the Project's rotor swept area would be approximately 20% larger than described in the PEIR. Commenters maintain that the Project may thus result in more severe avian mortality due to greater rotor swept area per turbine. Although the higher output machines would benefit energy production proportional to each turbine site and collectively for the Project overall with potentially fewer individual turbines than might otherwise have been proposed, there is no clear evidence that substantially more individual fourth-generation turbines could be placed within the Project site.

   As indicated in the EA and in the Notice of Preparation, the proposed turbines are larger compared to the turbines described in the PEIR. The PEIR evaluated a range of turbine specifications, including hub heights from 80 to 96 meters, and blade lengths ranging from 41.25 to 62.5 meters, and, thus, the PEIR anticipated blade heights down to 17.5 meters above the ground surface. Some of the Project's blade heights would decrease this distance to 13 meters above the ground. A 4.5-meter decrease in height above the ground surface is unlikely to substantially intensify impacts compared to the effects of the 3.0 MW turbines considered in the PEIR.

   Although the size of the turbines proposed for the Project would be moderately larger in physical dimensions as described above, the increased capacity of up to 33% more MW than the 3.0-MW capacity of the largest turbine used for estimating avian mortality due to repowering the whole APWRA in the PEIR, indicates the potential for a proportional increase in environmental impacts, especially on birds and bats. Due to the causal relationship between MW output and mortality of birds and bats presented in the PEIR, increased impacts on birds and bats could theoretically result on a per turbine basis.

Some commenters stated that the Project objective of 144.5 MW of capacity is a major change compared to either the 34 MW Sand Hill project described in the PEIR or the 36 MW Sand Hill project approved in 2016. Commenters also asserted that the additional grading and road widening that would be required for the larger turbines and the new operations and maintenance building would be larger than anticipated in the PEIR. However, the County does not consider the proposed Project a change to the prior 34 MW or 36 MW projects or a change in the description of the *Program* described in the PEIR, which is the approval of repowering projects within the APWRA boundary identified in the PEIR. The use of the Sand Hill name simply indicates that the current owner of the Sand Hill Wind, LLC assets will make use of an existing entity to achieve the same individual project goals as for any project described in the PEIR. In addition, the PEIR addressed a project with up to 52 individual wind turbines and similar requirements for project road grading and widening to a maximum of 40 feet (the Golden Hills Wind Project, described as having temporary construction widths up to 52 feet including a road bed of 40 feet in width plus two 6-foot-wide shoulders; see PEIR, p. 2-29). The addition of an operations and maintenance facility, which was proposed in the project analyzed by the EA, and which the applicant has since decided not to install, would have been deemed comparable to a similar facility proposed with an unspecified location for the Golden Hills Wind Project, evaluated in the PEIR (PEIR, p. 2-31) and subsequently approved.

The commenters also assert that, when combined with the other projects described in the PEIR, the proposed Project's 144. 5 MW of generation would cause the maximum number of MW that the PEIR evaluated, specifically 417 MW for Alternative 1 and 450 MW for Alternative 2, to be exceeded. <u>As described in Chapter 2, the total gross MW of wind development resulting from the combined individual projects within the APWRA may ultimately exceed the 450 MW analyzed in the PEIR, however the proposed project by itself would not result in the total capacity evaluated in the PEIR being exceeded. Subsequent projects that would result in wind development beyond the 450MW capacity will be required to conduct subsequent environmental review to account for impacts not analyzed in the PEIR. The analysis of cumulative impacts in Chapter 5 of this SEIR considers development of all projects within the APWRA among the past, present and reasonably foreseeable projects contributing to cumulative impacts on various resources.</u> ~~However, less than 30% of the maximum buildout of Alternative 2 is in place as of July 2019 (about 132 MW of 450 MW). With construction of the two other approved projects (Summit Wind, 54 MW and Patterson Pass, 19.8 MW, but not including the prior Sand Hill 36 MW project), generation would be approximately 206 MW, or less than half of the Alternative 2 maximum buildout of 450 MW. As a result, the Project would not result in more than 450 MW of capacity in the APWRA, and it is speculative to suggest that the capacity evaluated in the PEIR would be exceeded by the current Project. The buildout of Alternative 2 is discussed further in Chapter 2, Project Description.~~

2. *Changes in Circumstances*: Commenters made assertions that there are substantially changed circumstances that require a subsequent EIR, in that the first- and second-year monitoring reports for the Golden Hills Wind Project indicated higher numbers of fatalities for golden eagles and red-tailed hawks (two noted examples) compared with the numbers of fatalities that were predicted for the Golden Hills Wind Project in the SEIR. Although the County recognizes certain features of the current Project were not specifically addressed in the PEIR, and there may be some new information as discussed below regarding the potential effects of the repowering program, the County does not consider the Project changes as constituting changes to the circumstances in which the Project was proposed. All of the comments asserting that there are changed circumstances that would involve a new significant effect or a substantial increase in

the severity of previously identified significant effects appear to refer more directly to *new information*, such as the recent monitoring reports or the recent designation of the tricolored blackbird as a threatened species under state law. The role of new information on the decision to prepare the SEIR is discussed below.

3. *New Information*: Comments received in October 2018 on the EA asserted that there is new information of potentially substantial importance that was not and could not have been known at the time the PEIR was completed. The PEIR was certified in 2014, and the first-year monitoring report for the Golden Hills Wind project, prepared by H.T. Harvey & Associates, was completed in February 2018. This monitoring report indicated higher levels of avian mortality, including bats, than the PEIR estimated using results from repowering projects existing at that time. A second-year report for the Golden Hills Wind Project by the same authors and published in December 2018 indicated levels of mortality similar to those of the first year. For example, whereas the PEIR estimated a range of 1 to 4 golden eagle fatalities per year for the Golden Hills Wind Project (one of two projects evaluated at a project level in the PEIR), the first-year monitoring report estimated 10 to 12 golden eagle fatalities; mortality for red-tailed hawks was also greater, with an estimated 70 fatalities compared with only 9 to 22 fatalities anticipated in the PEIR for the Golden Hills Wind Project.

   However, as stated in the EA and the PEIR, at the time of the PEIR completion and certification, there was substantial uncertainty about the level of avian mortality that would result from the repowered turbines, because the estimates of avian mortality expected to result with turbines of this kind were based on a combination of rates from projects in the APWRA with diverse types of turbines. Records for projects with notably smaller turbines are more extensive than records for projects with larger turbines. The mortality rates were derived from a wide range of survey protocols, and the physical settings of each project were also diverse. Consequently, in suggesting that repowering could reduce avian impacts, the PEIR did not base its impact conclusion on a numeric range of mortality estimates. Instead, the PEIR concluded the impact would remain significant and unavoidable because, and specifically stated:

   > As described [in the discussion of each individual avian species], for all avian focal species analyzed, a fully repowered program area would be expected to reduce estimated fatality rates. However, fatalities would still be expected to result from the operation of the repowered turbines, and uncertainty surrounding the accuracy of the estimated fatality rates and the types of species potentially affected remains. Considering this information, and despite the anticipated reductions in avian impacts compared to the baseline rates, the County has determined to use a conservative approach for the impact assessment, concluding that turbine related fatalities could constitute a substantial adverse effect on avian species because the rates for some or all of the species could be greater than the baseline rates. This impact would be significant. Implementation of Mitigation Measures BIO-11a through BIO-11i would reduce this impact, but not to a less-than-significant level; accordingly, this impact is considered significant and unavoidable. (PEIR page 3.4-121. See also, PEIR page 3.4-103).

   Thus, although the first- and second-year Golden Hills Wind Project mortality results do constitute new information, they do not conclusively show that avian impacts for this project will be substantially more severe than anticipated in the PEIR. This is because the PEIR conservatively assumed that, even though estimates at that time based on three repowering projects in the same region appeared to indicate considerable reductions in mortality among all focal raptor species, further study could show – as in the present case – that avian impacts "could be greater than the baseline rates" and would be significant and unavoidable.

Additionally, commenters suggested that the action by the California Fish and Game Commission in April 2018 to re-designate the tricolored blackbird from a species of special concern to a threatened species under the California Endangered Species Act is a changed circumstance that contributes to the need for a subsequent EIR. However, the re-designation would not involve a new significant impact or require new mitigation measures because impacts on this species were previously recognized in the 2014 PEIR as well as in the 2018 EA for the Project. The mitigation measures identified in the PEIR (and noted in the EA) would apply regardless of the specific status of the species.

In summary, the County decided to prepare this SEIR based on the specific physical characteristics of this project, which would, as described in item 1 above, include turbines substantially larger than those analyzed in the PEIR, and therefore could potentially result in different impacts than identified in the PEIR. Those impacts are specifically analyzed in this SEIR.

1.5 Scope of the Subsequent EIR

The SEIR is focused on differences in information and the specific distinctions of the Project compared with the anticipated characteristics of repowering projects as described in the PEIR. Identifying the potential for new or different mitigation measures and alternatives to the Project is among the primary objectives of the SEIR. In addition, the SEIR discusses some program-level issues that may apply to some future repowering projects. The PEIR provided for identification of specific impacts and appropriate mitigation for buildout of either of two generating capacity scenarios for the APWRA as potential PEIR outcomes using quantified land disturbance estimates for each of several different project aspects, and separately for two individual projects. However, this SEIR is fundamentally a project-level EIR and is only intended to assess the impacts of the Project and to identify appropriate, applicable mitigation measures, all of which (impacts and mitigation measures alike) were described in the PEIR. However, to streamline analysis, CEQA documents for future wind energy projects that will tier from the PEIR may incorporate by reference the updated information provided herein.

Chapter 2, *Project Description*, provides updated information about repowering in the APWRA and provides context to aid in the analysis of the Project, some of which may have consequences for other future projects. The following issues are discussed in Chapter 2:

- Wind Resource Area capacity.
- Changes in wind turbine technology.
- Latest science and monitoring results regarding avian and bat fatalities.
- An updated raptor conservation mitigation measure.
- Setback requirements.
- Federal Aviation Administration lighting requirements.
- Site development review.
- Avian Protection Plan and annual reporting requirement changes.
- The extent of temporary and permanent land disturbance.

1.6 Organization of this Supplemental EIR

The SEIR is organized in the following chapters.

- *Executive Summary* presents a brief summary of the project; summarizes the impacts and mitigation measures; identifies areas of known controversy, including issues raised by agencies and the public; and identifies unresolved issues. The *Executive Summary* also summarizes the proposed Project's growth-inducing impacts, cumulative impacts, significant and unavoidable impacts, and significant irreversible impacts.
- Chapter 1, *Introduction*, explains the purpose of this SEIR, and discusses the environmental review process.
- Chapter 2, *Project Description*, describes the proposed Project and updated information related to future projects that may be tiered under the PEIR.
- Chapter 3, *Impact Analysis*, consists of sections containing the environmental analysis for each environmental topic (e.g., aesthetics, air quality, noise). This chapter identifies Project impacts and mitigation measures.
- Chapter 4, *Alternatives*, contains discussion of the project alternatives. As allowed by CEQA, most of the impacts of these alternatives are evaluated at a more general level than are the impacts of the proposed Project.
- Chapter 5, *Other CEQA Considerations*, presents the analysis of the proposed project's growth-inducing impacts, a summary of cumulative impacts, and the identification of significant and irreversible, as well as significant and unavoidable environmental changes.
- Chapter 6, *Report Preparers*, lists the SEIR authors, the technical specialists and members of the production team, and other key individuals who assisted in the preparation and review of this SEIR.
- ~~Technical appendices with supporting data and information are presented at the end of this SEIR~~Appendix A, *Comments on the NOP*, provides the Notice of Preparation and scoping comments that were received in response.
- Appendix B, *Air Quality Modeling*, provides the assumptions on which the air quality analysis is based.
- Appendix C, *Animal and Plant Species List*, was obtained from the California Department of Fish and Wildlife, California Native Plant Society, and the U.S. Fish and Wildlife Service, and provides a list of the special-status plant and wildlife species identified as having recorded occurrences and/or the potential to occur in the Project vicinity.
- Appendix D, *Water Supply Assessment*, provides the analysis of water supply for the Project.
- Appendix E, *Comments on the Draft Subsequent Environmental Impact Report and Responses to Comments*, provides reproductions of annotated comment letters and responses to those comments.

1.7 Environmental Review Process

1.7.1 Notice of Preparation

The County distributed a notice of preparation (NOP) of a draft SEIR for the proposed Project on January 3, 2019. The NOP was distributed for a 30-day comment period that ended on February 6, 2019. At the request of the California Attorney General's Office, the period was extended for 7 calendar days to February 13, 2019. The NOP is provided in Appendix A. Comments on the NOP were considered in the preparation of the SEIR, and are also included in Appendix A.

CEQA does not require formal hearings at any stage of the environmental review process (State CEQA Guidelines 15202[a]). However, it does encourage "wide public involvement, formal and informal...in order to receive and evaluate public reactions to environmental issues" (State CEQA Guidelines 15201).

1.7.2 Public Review

CEQA requires the County (the lead agency) to prepare an EIR (including an SEIR) that reflects the independent judgment of the agency regarding the impacts, the level of significance of the impacts both before and after mitigation, and the mitigation measures proposed to reduce the impacts. A draft EIR is circulated to responsible agencies, trustee agencies with resources affected by the project, and interested agencies and individuals. The purposes of public and agency review of a draft EIR include sharing expertise, disclosing agency analyses, checking for accuracy, detecting omissions, discovering public concerns, and soliciting counterproposals.

Reviewers of a draft EIR should focus on the sufficiency of the document in identifying and analyzing the possible impacts on the environment and ways in which the significant effects of the project might be avoided or mitigated. Comments are most helpful when they suggest additional specific alternatives or mitigation measures that would provide better ways to avoid or mitigate significant environmental effects.

Th~~is~~e draft SEIR ~~i~~was available for review and comment by the public, responsible agencies, organizations, and other interested parties for a 45-day period from August 9, 2019 through 5:00 p.m. on October 4, 2019. Comments ~~must be received either electronically or physically~~ were due to the County by 5 p.m. on the last day of the comment period, October 4, 2019. All comments or questions about the draft SEIR ~~sh~~could be addressed to Andrew Young, Planner, ATTN: SEIR, Alameda County Community Development Agency, 224 W. Winton Avenue, Suite 110, Hayward, CA, 94544, or via email with subject line "Sand Hill Wind Repowering Project SEIR" to: andrew.young@acgov.org. The County ~~will~~ conducted a public hearing during a noticed East County Board of Zoning Adjustments meeting to present the conclusions of the draft SEIR and solicit comments on the document. The hearing was held at 1:30 p.m. on September 12, 2019, in the City of Pleasanton Council Chambers, 200 Old Bernal Avenue, Pleasanton. The hearing ~~will~~ also provided agencies and the public with opportunities to clarify any questions or concerns about the draft SEIR. Minutes from this hearing are provided in Appendix E: *Comments on the Draft Subsequent Environmental Impact Report and Responses to Comments*.

1.7.3 Final SEIR

Comments on the draft SEIR received during the review period ~~will be~~ were used to prepare ~~a~~this final SEIR. The County will hold a public hearing before certifying this~~e~~ final SEIR, during which the public and agencies can provide additional comments. When the County decides whether to certify the SEIR and approve the Project, it will consider the 2014 PEIR as revised by this~~e~~ SEIR.

Chapter 2
Project Description

2.1 Sand Hill Wind Project

2.1.1 Project Location and Land Ownership

The Project area comprises 15 parcels extending over approximately 2,600 acres (Table 2-1 and Figure 2-1) within the Altamont Pass Wind Resource Area (APWRA).

Table 2-1. Parcels and Proposed Uses[a]

Assessor's Parcel Number	Acreage	Proposed Use
99B-7750-6	101	Wind turbines and associated facilities
99B-6325-1-4	69	Access and setback
99B-6325-1-3	224	Wind turbines and associated facilities
99B-7375-1-7	314	Wind turbines and associated facilities
99B-7400-1-5	598	Wind turbines and associated facilities
99B-7300-1-5	443	Wind turbines and associated facilities
99B-7050-4-6	73	Wind turbines and associated facilities
99B-7050-1-9	82	Wind turbines and associated facilities
99B-7050-4-1	27	Access and setback
99B-7350-2-1	2	Access and setback
99B-7350-2-15	334	Wind turbines and associated facilities
99B-7350-2-5	57	Access and setback
99B-7500-3-2	53	Wind turbines and associated facilities
99B-7500-3-1	113	Wind turbines and associated facilities
99B-7600-1-1	105	Wind turbines and associated facilities
Total	2,595	

[a] The generation-tie lines and substations are not included in this list because they are existing facilities that would be upgraded as part of the proposed Project.

The Project area is located in the eastern Altamont Pass area of Alameda County, north and south of Altamont Pass Road between 0.67 and 2 miles west of Grant Line Road, east and west of Mountain House Road, between 0.25 and 2 miles north of Grant Line Road, west of the Delta-Mendota Canal, 1 mile northwest of Mountain House Road, west of Bethany Reservoir, and southeast of the intersection of Christensen and Bruns Roads.

2.1.2 Existing Conditions and Land Uses

Altamont Pass Wind Resource Area

The APWRA is located in the Altamont Hills of eastern Alameda County near the San Joaquin County line, north and south of Interstate 580, and approximately 56 miles east of San Francisco. The Altamont Hills are at the geographical interface between the coastal mountains and the Central

Valley (Figure 1-1). The boundaries of the program area have not changed since the certification of the PEIR.

Project Area Existing Conditions and Land Uses

Generally characterized by rolling foothills of annual grassland, the mostly treeless Project area is steeper on the west and gradually flatter to the east where it slopes toward the floor of the Central Valley. Elevations in the area range from approximately 600 to 1,200 feet above sea level. Land use in the Project area and the surrounding APWRA consists largely of cattle-grazed land supporting operating wind turbines and ancillary facilities. All of the parcels were previously used for wind energy production, although about half the area has not contained wind turbines for about two decades.

Sand Hill has lease agreements with the landowners to install, operate, and maintain the repowered wind turbines while allowing ongoing agricultural activities to continue.

Wind Turbines and Foundations

Wind turbines and foundations exist in the Project area. The proposed Project may include the removal of old turbine foundations where they conflict with the location of repowered Project components (e.g., roadways and ground equipment).

Access Roads

Primary access to the Project area is through locked gates off Altamont Pass Road and Mountain House Road. Onsite roads are graveled and vary in width from 12 to 20 feet.

Meteorological Towers

Four 50-meter (164-foot) meteorological towers are present onsite. These towers monitor and record meteorological data such as wind speed, wind direction, and atmospheric pressure.

Power Collection System

Electricity generated by a portion of the previous project was collected from each wind turbine and transmitted to the AML and Dyer Road substations, where the voltage was increased for interconnection with Pacific Gas and Electric Company’s (PG&E’s) transmission lines. The collection system comprises pad-mounted transformers, underground cables, overhead cables on wooden poles, assorted circuit breakers and switches, electrical metering and protection devices, and the substations.

Several PG&E transmission lines bisect the Project parcels. The point of interconnection at the Dyer Road substation has been relocated to the Santa Clara substation. The existing AML substation encompasses 0.6 acre north of Altamont Pass Road; the existing Santa Clara substation encompasses 0.2 acre south of Altamont Pass Road.

Cattle Handling and Staging Areas

Several cattle handling and staging areas are located in the Project area.

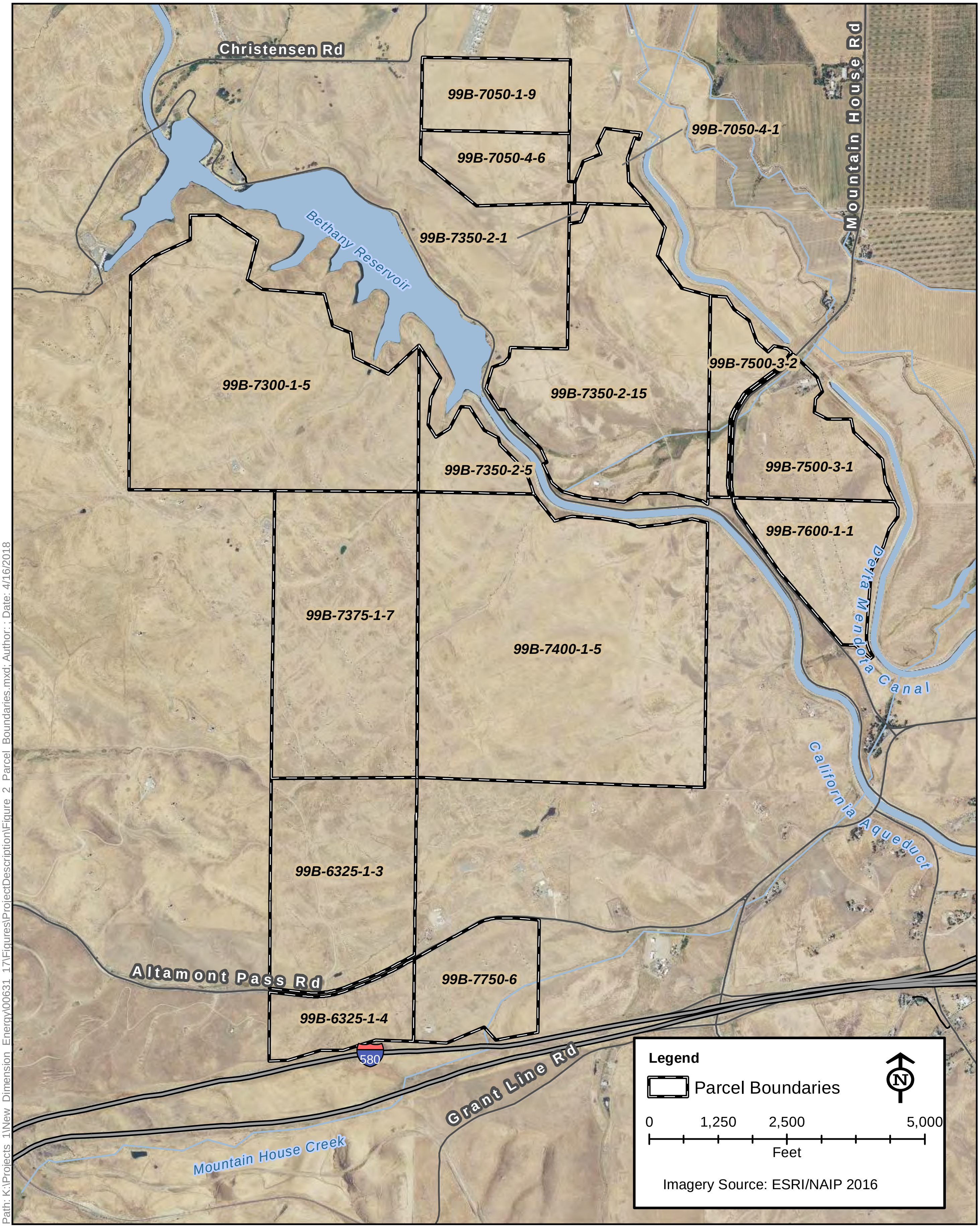

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Figure 2-1
Parcel Boundaries

2.1.3 Project Need, Goals, and Objectives

The underlying purpose of the Project is to repower a large segment of the program area with a commercially viable wind energy facility that would be subject to a single, uniform avian monitoring protocol and help meet the state's Renewables Portfolio Standard (RPS), greenhouse gas (GHG) reduction, and carbon neutrality goals.

The fundamental objectives of the Project are as follows:

- To maximize wind energy production for Power Purchase Agreements obtained for the Project by siting up to 40 new wind turbines on leased lands within the program area.
- To maintain commercial viability.

The secondary objectives of the Project are as follows:

- To minimize environmental impacts by:
    - Limiting ground disturbance through the re-use of existing infrastructure (e.g., roads, transmission lines) where feasible.
    - Improving understanding of the effects of new generation turbines on birds and bats by applying the same avian mortality monitoring protocol across a large segment of the program area, rather than separate protocols for multiple separate projects.
- To increase local short-term and long-term employment opportunities.
- To provide economic benefits to Alameda County.
- To assist California in meeting its RPS, GHG reduction, and carbon neutrality goals.

2.1.4 Proposed Project Characteristics

Sand Hill is proposing the Project on 15 privately owned parcels in the APWRA (Figure 1-1). The proposed Project would entail installation of up to 40 new wind turbines and is expected to utilize turbines with generating capacities of 2.3 to 4.0 megawatts (MW), all generally similar in size and appearance, to generate up to 144.5 MW. Three conceptual alternative layouts are proposed, each using up to 40 wind turbines. The layouts are substantially similar, mainly varying according to the location of 11 turbines in the center of the Project area, south and west of Bethany Reservoir, and their relative distance from the primary access road for the Project. The final layout would be selected based on site constraints (e.g., avian siting considerations), data obtained from meteorological monitoring of the wind resources, and turbine availability. Existing roads would be used where possible, and temporary widening and some new roads would be necessary. The Project would also require three generation-tie (gen-tie) lines connecting the Project to two substations.

The proposed Project characteristics are listed below, illustrated in Figures 2-2a through 2-2c, and discussed in greater detail in the following subsections.

- A total nameplate generation capacity of up to 144.5 MW.
- Removal of old wind turbine foundations where they conflict with new Project components.
- Installation of up to 40 new wind turbine generators, towers, foundations, and pad-mounted transformers.
- Development of Project roads and installation of a power collection system.

- Use of existing roads to the extent possible.
- Use of existing substations (with upgrades to the equipment).
- Use of an existing operations and maintenance (O&M) facility.
- Installation of three permanent meteorological towers.

Wind Turbines

Wind Turbine Characteristics

Most of the turbines being repowered in the APWRA were installed during the 1980s and represent first- and second-generation utility-grade commercial wind turbine technology, now considered old technology. The terms *first-generation*, *second-generation*, *third-generation*, and *fourth-generation* are used to group wind turbine types with similar technologies currently installed or to be installed in the program area. In this context, first-generation wind turbines are those designed and installed during the 1980s. Second-generation turbines are those designed and installed during the 1990s. Third-generation turbines are those installed in previous repowering projects and which use similar design to turbines proposed for the Project, but that are of smaller size (i.e., up to 1 MW). Fourth-generation turbines, such as those proposed for installation as part of the Project, are large, 1.6 to 4.0 MW turbines.

The proposed Project would entail installation of up to 40 fourth-generation turbines in the Project area. Turbines being considered range in nameplate capacity from 2.3 to 4.0 MW, and have a rotor diameter of 90 to 140 meters (295 to 459 feet), tower height of 80 to 110 meters (262 to 361 feet), and a maximum total turbine height of 152 meters (499 feet). The current Project layout assumes the use of turbines with the specifications presented in Table 2-2.

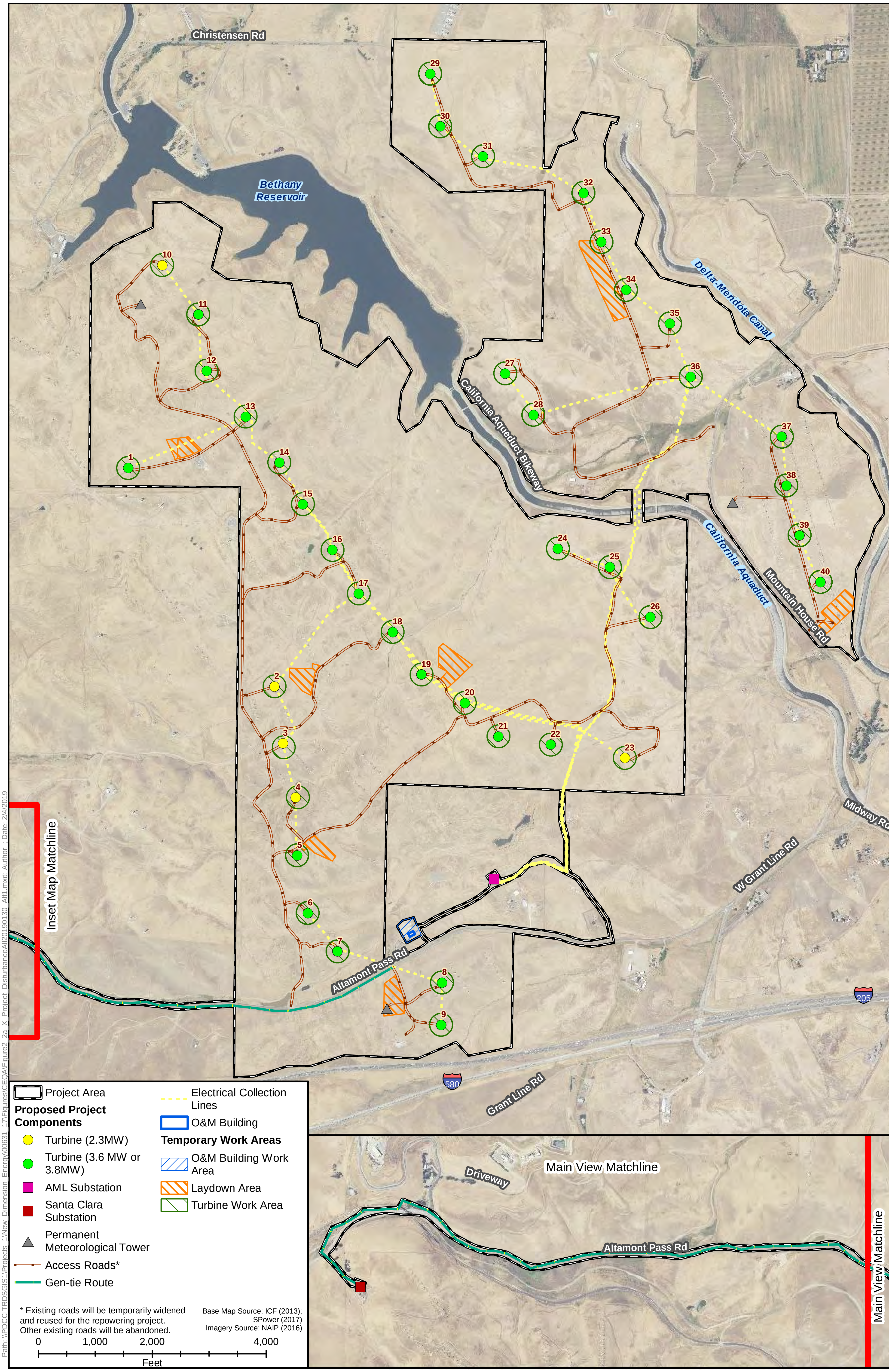

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Figure 2-2a
Sand Hill Wind Repowering Project Layout 1

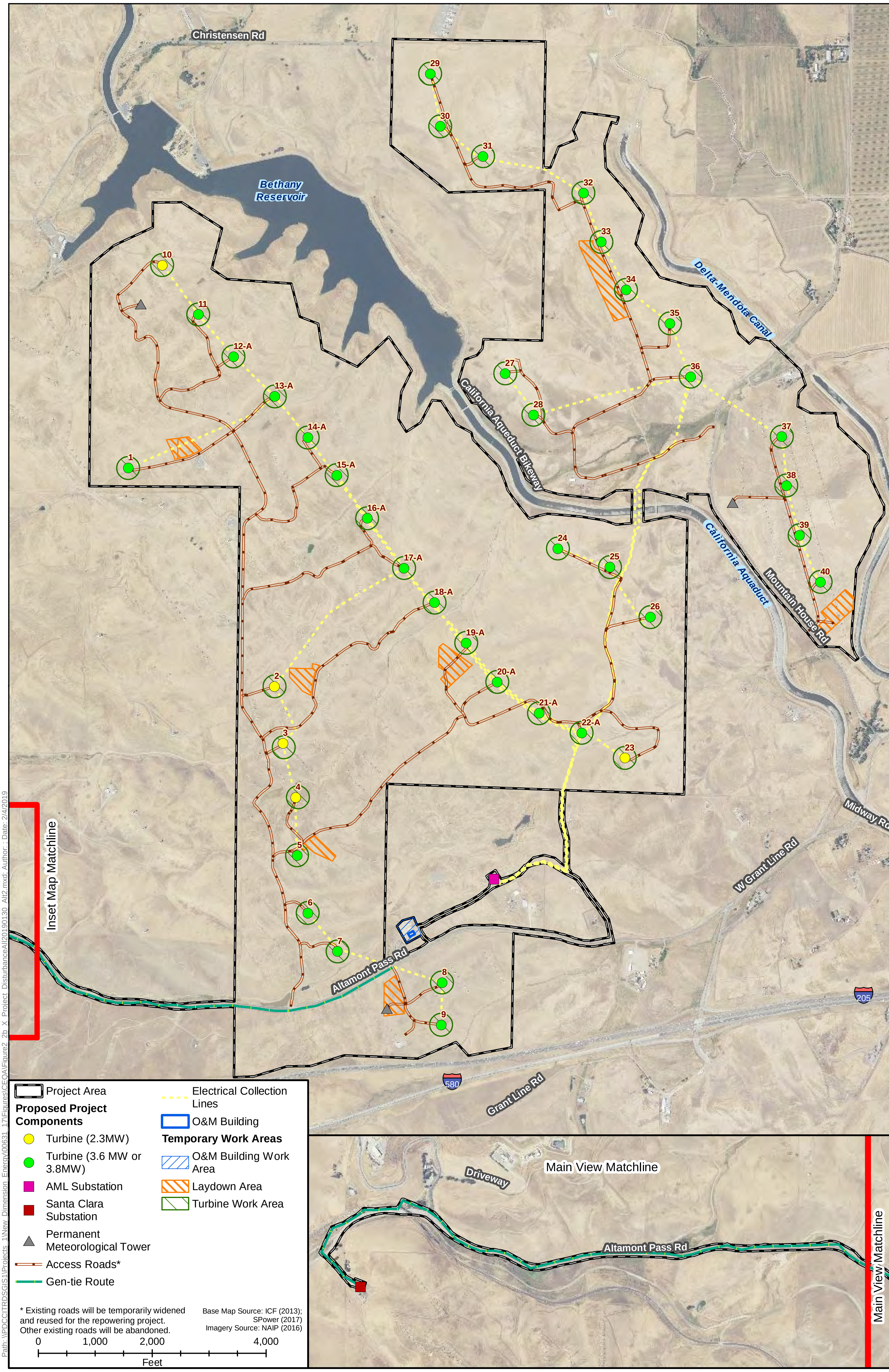

Figure 2-2b
Sand Hill Wind Repowering Project Layout 2

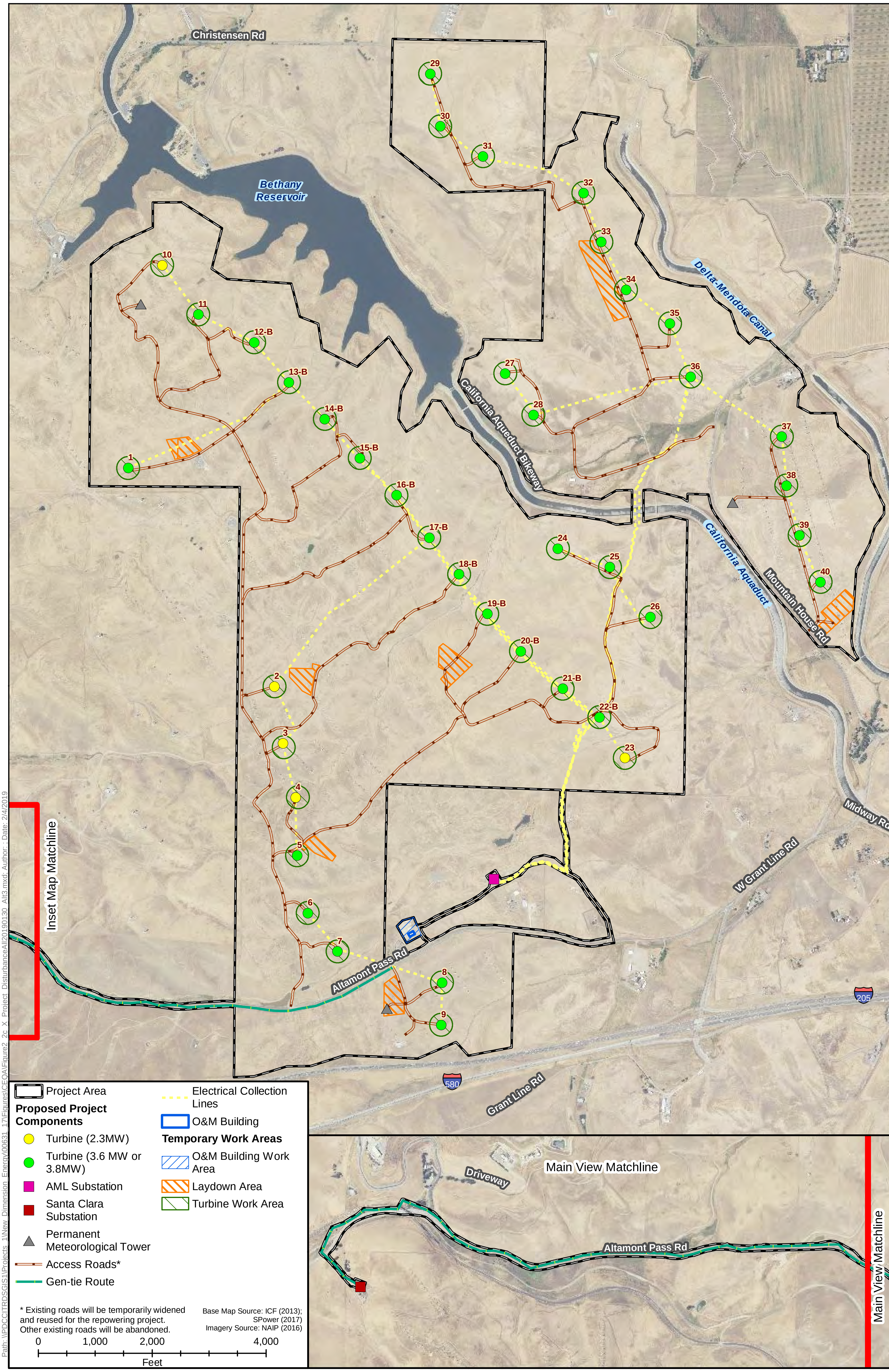

Figure 2-2c
Sand Hill Wind Repowering Project Layout 3

Table 2-2. Turbine Specifications[a]

Turbine Characteristic	Turbine Model		
	General Electric 2.3–116	General Electric 3.6–137	General Electric 3.8–130
Rotor type	3-blade/horizontal axis	3-blade/horizontal axis	3-blade/horizontal axis
Blade Length	56.9 m (187 ft)	67.2 m (220 ft)	63.7 m (209 ft)
Rotor diameter	116 m (381 ft)	137 m (449 ft)	130 m (427 ft)
Rotor swept area	10,568 m^2 (113,753 ft^2)	14,741 m^2 (158,671 ft^2)	13,273 m^2 (142,869 ft^2)
Rotational speed	Variable: 5.0–14.9 rpm	Variable: 6.3–13.6 rpm	Variable: 6.95–12.1 rpm
Tower type	Tubular	Tubular	Tubular
Tower (hub) height	80 m (262 ft)	81.5 m (267 ft)	85 m (279 ft)
Rotor height (from ground to lowest tip of blade)	22 m (72.2 ft)	13.0 m (42.7 ft)	20 m (65.6 ft)
Total height (from ground to top of blade)[b]	138 m (453 ft)	150 m (492 ft)	150 m (492 ft)

ft = feet; ft^2 = square feet; m = meters; m^2 = square meters; MW = megawatts; rpm = revolutions per minute.

[a] Depending on availability at the time of construction, turbines of up to 4.0 MW may be used for the proposed Project. Turbine dimensions would not exceed those shown in the table and the Project capacity would not exceed 144.5 MW.

[b] Depending on the type of turbine and tower height used for the proposed project, total height would be up to but would not exceed 152 m (499 ft).

Wind Turbine Foundations

The type of turbine foundation used depends on terrain, wind speeds, and wind turbine type. Two foundation types may be used in repowering APWRA wind projects: an inverted “T” slab foundation or a concrete cylinder foundation. An inverted T slab foundation is a type of spread footing foundation. A single concrete pad is placed at ground level, although part of the pad may be placed below ground level depending on the slope. At the center of the pad is a cylindrical concrete pedestal to which the wind turbine tower is bolted—hence the name inverted T.

A concrete cylinder foundation is a large concrete cylinder with a concrete pedestal that is slightly larger than the tower base diameter. The size of the concrete cylinder and pad is determined by wind turbine size and site-specific conditions (e.g., expected maximum wind speeds, soil characteristics). Its weight must be sufficient to hold the wind turbine in place.

Either type of foundation is typically formed by placing concrete in an excavated footing with reinforced steel. The foundation would be installed immediately within the turbine work area adjacent to the crane pad. Although the foundation type is determined by terrain, wind speeds, and turbine type, in general, the foundation is formed by placing concrete in an excavated footing with reinforced steel. A small graveled area would encircle each foundation to facilitate maintenance access. The total diameter of the final Project footprint for each turbine, including the graveled area, would be approximately 60 feet.

Safety Lighting

Lighting of the wind farm would be in compliance with the Federal Aviation Administration (FAA) Obstruction Marking and Lighting Advisory Circular (AC70/7460-1L). Nighttime safety lighting would consist of FAA L-864 aviation red obstruction lights, which would be placed as high as possible on the turbine nacelle to be visible from any direction. Because some evidence suggests that lights may be an attractant for birds during nighttime migration (Kerlinger et al. 2010), the minimum number of required lights would be used to minimize attractants for birds during nighttime migration.

Lightning Protection

Lightning protection would be incorporated as a standard element of the turbine design. The system would incorporate lightning receptors (including at the outermost blade tip and the blade root surface) and diverter strips in the blades that provide a path for the lightning strike to follow to the grounded tower. The system control and data acquisition system would document all critical lightning events and, if a problem is detected, the turbine would shut down automatically and be inspected to assure that damage has not occurred.

Site Preparation and Access Roads

Fourth-generation turbine towers and blades are significantly longer than older turbine components and require larger and longer trucks and cranes for transport and installation. These vehicles require wider roads with shallower turns and gradients than exist in the Project area. Consequently, the existing road infrastructure must be upgraded to accommodate construction of the turbines. Road infrastructure upgrades would include grading, widening, and re-graveling of the existing roads. Existing road widths vary from 12 to 20 feet; future roads are expected to be approximately 20 feet wide. New roads may be needed in areas where existing roads do not provide access to proposed turbine locations.

Most roads in the portion of the Project area where new turbines would be installed would be temporarily widened to approximately 40 feet to accommodate vehicles hauling larger towers as well as the larger equipment necessary to install them. It is likely that the locations where roads curve as they climb hills to the ridgetops would require more work and would be widened to more than 40 feet in some spots to safely accommodate the larger equipment. In addition, access road entrances from main roads onto the Project site would need to be widened to provide sufficient space for the minimum turning radius of construction cranes and other flatbed delivery trucks. Lands subject to temporary road widening beyond a 20-foot permanent width would be reclaimed after construction.

Culverts are generally installed as part of the road drainage system on slopes, although some are installed at small stream crossings. Existing culverts may need to be replaced with larger culverts or reinforced to provide adequate size and strength for construction vehicles.

Power Collection System

Each new wind turbine must be connected to the medium-voltage electrical collection system via a pad-mounted transformer. The collection system carries electricity generated by the turbines to a substation, where the voltage level of the collection system is stepped up to that of the power grid. From the substation, electricity is carried through an interconnection point to the transmission lines that distribute electricity to the power grid. Transmission lines in the Project vicinity are maintained by PG&E. Each of the collection system components is discussed below.

Collection Lines

Medium-voltage collection lines would collect power from each turbine for conveyance to the substation. Medium-voltage lines are normally up to 35 kilovolts (kV). The new medium-voltage collection lines would be installed underground (Figures 2-2a to 2-2c).

Collection lines would be installed over the California Aqueduct using an overhead electrical line on poles or connecting conduit to an existing bridge, or under the California Aqueduct using horizontal directional drilling (HDD) techniques. If installed under, two bores under the California Aqueduct are planned, each approximately 250 feet long. Bores may also be conducted under existing roads or other infrastructure such as gas lines. Additionally, based on site-specific conditions, bores under wetlands and streams may be conducted. A determination of which collection lines would be installed under wetlands would be made prior to construction. For the purposes of estimating impacts, it was assumed that all wetlands could be disturbed using the cut-and-cover construction method (i.e., the most impactful construction method for installing the collection lines) described below in the *Power Collection System and Communication Lines Installation* subsection.

HDD involves the use of a steered drilling head, which allows the bore machine to sit at ground level, bore down along on the collection line route, and direct the bore back up to the surface at a distant point. The bore machine uses a drilling fluid in the process, typically a mixture of fine clay (such as bentonite) and fresh water. The clay and water mixture coats the wall of the borehole to help hold it open and to provide lubrication for the drill stem and conduit being installed. Excess drilling fluid is typically captured using a vacuum truck.

Collection lines for the majority of the Project would convey power from the turbines to the AML substation. Collection lines for a portion of the Project would be installed underground to an intersection with an existing distribution line. At the interconnection with the existing distribution line, a gen-tie line would be installed underground or overhead, making use of existing overhead power poles where possible. If the gen-tie line is carried on existing poles, the line would need to be strung with new conducting wire (i.e., reconductored), requiring work areas (i.e., pull sites) to string the upgraded power line. The gen-tie line would connect to the existing Santa Clara substation (Figures 2-2a through 2-2c). Additionally, some power poles may need to be replaced. If new overhead collection or gen-tie line facilities are required, they would be completed in compliance with the latest recommendations of the Avian Power Line Interaction Committee.

Transformers and Power Poles

Transformers boost the voltage of the electricity produced by the turbines to the voltage of the collection system. Each turbine would have its own transformer adjacent to or within the turbine, either mounted on a small pad adjacent to the turbine or within the tower.

The installation of overhead power lines and poles onsite would be limited to locations where underground lines are infeasible and locations immediately outside the substations where underground medium-voltage lines come aboveground to connect to the substations.

Substations

The main functions of a collector substation are to step up the voltage from the turbine collection lines to the transmission level and to provide fault protection. The basic elements of the substation facilities are a control house, a bank of one or two main transformers, outdoor breakers, capacitor banks, relaying equipment, high-voltage bus work, steel support structures, an underground grounding grid, and overhead lightning-suppression conductors. The main outdoor electrical equipment and control house are installed on a concrete foundation. The Project would connect to two existing substations as described below.

The AML substation served as the collector substation for a portion of the previous wind project. The AML substation consists of a graveled footprint area of approximately 0.6 acre, a 12-foot chain-link perimeter fence, and an outdoor lighting system. The AML substation would not be expanded; however, equipment within the existing fence may be upgraded for the Project. Any new lights would be shielded or directed downward to reduce glare. The upgraded substation would remain fenced in keeping with the fencing around the existing substation (i.e., 12-foot chain link perimeter fencing).

The Santa Clara substation consists of a graveled footprint area of approximately 0.2 acre, a 12-foot chain-link perimeter fence, and an outdoor lighting system. The Santa Clara substation would not be expanded; however, equipment within the existing fence may be upgraded for the Project. Any new lights would be shielded or directed downward to reduce glare. The upgraded substation would be fenced in keeping with the fencing around the existing substation (i.e., 12-foot chain link perimeter fencing).

Operations and Maintenance Facility

An existing O&M building and yard would be used for the Project (Figures 2-2a through 2-2c). Additional small storage buildings may be required at the site, but would be constructed within the existing fenced area of the existing O&M yard.

Project Construction

Temporary and Permanently Disturbed Land

Disturbance areas associated with Project construction were calculated by estimating disturbance associated with each alternative layout and are presented in Table 2-3. For the purposes of analysis in this SEIR, the scenario that would result in the most extensive impacts was used.

Table 2-3. Estimated Disturbance Associated with Project Construction (acres)[a]

Project Component/Activity	Permanent Impacts	Temporary Impacts
Power collection system installation	0.0	23.5
Generation-tie installation	0.0	8.6
Staging areas installation	0.0	31.2
New access roads	11.2	8.2
Access road expansion[b]	7.8	24.2
Turbine foundation installation	2.6	108.3
Meteorological tower installation	0.2	3.5
Total	21.8	207.5

[a] Three alternative layouts are proposed; the estimated disturbance reflects the layout with the most extensive impacts.

[b] Existing access roads would be reused to the extent possible; however, some sections of new access road would be required.

Construction Schedule

Construction activities are expected to commence in fall 2019. Foundation removal (removal, site restoration, and reclamation) activities associated with the existing turbine foundation sites that interfere with proposed turbine locations would occur concurrent with construction activities for the new turbines. Foundation construction and associated access roads would take place over 6 to 9 months. Construction activities would occur between 7:00 a.m. and 7:00 p.m. Monday through Friday and between 8:00 a.m. and 6:00 p.m. on Saturdays and Sundays.

Construction Equipment

Typical construction equipment used for wind farm facilities, as outlined in Table 2-4, is expected to be used for both foundation removal and construction activities.

Table 2-4. Typical Wind Farm Facility Construction Equipment

Equipment Type	Project Use	Duration of Use[a]
1-ton crew cab 4x4	All aspects of project construction	5 months
Grader	Road and pad construction; yards	8 months
Track type dozer	Road and pad compaction	4 months
Drum type compactor	Compaction, erosion, and dust control	4 months
Water truck	Dust control	5 months
Lowboy/truck/trailer/flatbed trucks	Off-loading towers and turbines and other materials	6 months
Backhoe/front loader	Move and carry soils and other construction debris/equipment	5 months
Excavator	Pad construction	6 months
Rock crusher	Road and pad construction	4 months
Trencher	Collection line installation	3 months
Cement trucks	Pad construction	3 months
Crane	Off-loading and erecting towers and turbines	4 months
Horizontal directional drilling bore machine	Collection line installation	2 months
Light duty trucks	All aspects of construction, delivery of personnel	8 months
Heavy duty trucks (including dump trucks)	Delivery of equipment and materials	8 months

[a] The duration of use for individual equipment would vary throughout the Project. Total cumulative estimates of equipment usage are provided.

Workforce

The workforce estimate is based on typical wind energy projects of similar size. The workforce would be expected to increase or decrease based on the phase of construction. Table 2-5 outlines expected typical personnel categories and workforce levels, in full-time equivalents. The Project would use local construction contractors and suppliers to the extent possible. The project management category includes field engineers, safety monitors, quality assurance/quality control (QA/QC) personnel, technicians, and the project manager.

Table 2-5. Construction Workforce

Personnel	Full-Time Equivalent
Carpenters	14
Electricians	25
Equipment operators	25
Foremen	15
Iron workers	30
Project management	16
Truck drivers	25

Construction Sequence

Typical construction steps are listed below.

- Demarcation of construction areas and any sensitive biological, cultural, or other resources needing protection.
- Construction of temporary staging areas.
- Road infrastructure upgrades.
- Erosion and sediment control.
- Wind turbine construction.
  - Final site preparation.
  - Crane pad construction.
  - Foundation excavation and construction.
  - Tower assembly.
  - Installation of nacelle and rotor.
- Power collection system and communication line installation.
- Gen-tie installation.
- Upgrades to the substation.
- Permanent meteorological tower installation.
- Final cleanup and restoration.

The construction contractors would prepare the Project area, deliver and install the Project facilities, oversee construction, and complete final cleanup and restoration of the construction sites. Sand Hill would implement best management practices (BMPs) consistent with standard practice and with the requirements of the PEIR as well as any state or federal permits to minimize soil erosion, sedimentation of drainages downslope of the Project area, and any other environmental impacts.

The construction activities and the approximate duration of each are listed below.

- Preparation of staging areas: 2 weeks.
- Road construction: 8 weeks.
- Construction of foundations and electrical work: 8 weeks.
- Turbine delivery and installation: 12 weeks.
- Electrical trenching and substation upgrades: 12 weeks.
- Cleanup: 12 weeks.

The equipment and workforce described in the *Construction Schedule*, *Construction Equipment,* and *Workforce* subsections would be utilized to perform the following foundation removal and construction activities for the Project.

- Demarcation of sensitive resources and construction area boundaries.
- Grading and road repair.

Temporary Staging Areas

Seven staging areas of various sizes, totaling up to 31.2 acres, would be established in the Project area. These areas would be used for the storage of turbine components, construction equipment, water tanks, office trailers, and other supplies needed for Project construction. The trailers would be used to support workforce needs and site security, and would also house a first aid station, emergency shelter, and hand tool storage area for the construction workforce. Parking areas would be located near the trailers. Vegetation would be cleared and the staging areas would be graded level. These areas would be constructed of native material, supplemented with gravel or soil stabilizer, if needed. Appropriate erosion control devices (e.g., earth berm, silt fences, straw bales) would be installed to manage water runoff. Diversion ditches would be installed, as necessary, to prevent stormwater from running onto the site from surrounding areas. Following completion of construction activities, the contractor would restore the temporary staging areas. The gravel surface would be removed, and the areas would be contour graded (if necessary and if environmentally beneficial) to conform to the natural topography. Stockpiled topsoil would be replaced, and the area would be stabilized and reseeded with an appropriate seed mixture.

Decommissioning and Removal of Existing Turbines

The applicant decommissioned and removed the old generation turbine blades, generators, towers, and old transformer equipment on all Project parcels under pre-existing permits in October 2018, shortly after environmental review of the proposed Project began. Remaining decommissioning activities would involve removing old foundations (where they conflict with new Project components), old substation equipment, and above-ground power lines; clean-up and disposal of any remaining debris; and salvaging any useful components or materials. Recycling and disposal of material would be subject to the County's waste ordinances. Old foundations are typically excavated and removed to a depth of 3 feet and remaining components buried in place. State and federal resource agencies would review the decommissioning plans to assess the potential need to leave some foundations in place for terrestrial habitat usage, and landowners would assist in determining which and to what extent existing access roads – primitive or more developed – should be retained, allowed to go to seed, or recontoured for grassland restoration.

Turbine Construction and Installation

Turbines would be delivered to the site from the Port of Stockton or other nearby port or rail transfer locations. Repowered turbine construction entails placement of a foundation, new tower, rotor, nacelle, and transformer. Construction and installation of repowered turbines is regulated by County conditions of approval, building permit requirements, and grading permit requirements.

Tower assembly requires the use of one large track-mounted crane and two small cranes. The turbine towers, nacelles, and rotor blades would be delivered to each foundation site and unloaded by crane. A large track-mounted crane would be used to hoist the base tower section vertically and then lower it over the threaded foundation bolts. The large crane would then raise each additional tower section to be bolted through the attached flanges to the tower section below. The crane then would raise the nacelle, rotor hub, and blades to be installed atop the tower. Two smaller wheeled cranes would be used to offload turbine components from trucks and to assist in the precise alignment of the tower sections.

At each turbine site, a level turbine work area would be graded to support the construction of tower foundations and to support the use of cranes to lift the turbine components into place. The extent and shape of grading at each turbine site would depend on local topography; however, each site would require approximately 2.5 to 2.9 acres of graded area to support the construction of foundations and installation of turbines. A crane pad would be leveled and graded within the turbine work area at each turbine site. The crane pad—a flat, level, and compacted area—would provide the base from which the crane would work to place the turbine. Most wind turbine construction activities would take place within the turbine work area. Following construction, the turbine work area would be reclaimed.

Construction and installation of turbines is regulated by the County's conditions of approval, building permit requirements, and grading permit requirements. The turbine towers, nacelles, and blades would be delivered to each turbine location in the order of assembly, once the concrete of the foundation has been poured and has cured sufficiently. Large cranes would be brought to each site to lift and assemble the turbine components. First, the base section of the tower would be secured to the foundation using large bolts. The remaining tower sections would then be lifted with the crane and connected to the base section. After the nacelle and rotor are delivered to the turbine site, the turbine blades would be bolted to the rotor hub, and the nacelle and rotor would be lifted by a crane and connected to the main shaft.

Excess rock generated by foundation construction would be spread on existing roads and maintenance areas surrounding the turbines. Old foundations from the previous wind project onsite may be removed if they are within proposed construction areas, if removal is necessary for the installation of new turbines, or to comply with landowner agreements or County requirements; such removals would involve workers demolishing the foundations using jackhammers or similar tools. The material from old turbine foundations may be reused for road base or hauled offsite to the Altamont Landfill.

Power Collection System and Communication Lines Installation

As described above, some power lines will be installed underground. Installation of underground medium-voltage lines is accomplished in most cases using a cut-and-cover construction method. A disturbance width of 20 feet is planned to allow for the trench excavation and equipment, but this width may vary depending on the topography and soil type. Typically, the topsoil is separated from the subsurface soil for later replacement. A 3-foot-wide trench is then plowed using a special bulldozer attachment that buries the line in the same pass in which it digs the trench. Once the power collection lines are in place in the trench, the trench is partially backfilled with subsurface soil. Typically, communication lines are then placed in the trench. The trench is then backfilled with the remaining subsurface soil, compacted, and covered with the reserved topsoil.

Transformers would be installed at each turbine, either mounted on a small pad adjacent to the turbine or within the tower.

To install power poles, a laydown area is required. To mount the medium-voltage lines on a power pole, a pull site and a tension site are required. Pole sites, pull sites, tension sites, access roads, and laydown areas would be cleared (i.e., mowed) if necessary. Pole holes and any necessary anchor holes would be excavated. Where possible, a machine auger would be used to install poles. The width and depth of the setting hole would depend on the size of the pole, soil type, span, and wind loading.

Power poles would be framed, devices installed, and any anchors and guy wires installed before the pole is set. Anchors and guy wires installed during construction would be left in place. After setting the pole, conductors would be strung.

The existing AML and Santa Clara substations would not be expanded; however, equipment within the existing substation fences may be upgraded for the Project. Any new lights would be shielded or directed downward to reduce glare. The upgraded substation would remain fenced in keeping with the fencing around the existing substation (i.e., 12-foot chain link perimeter fencing).

Erosion and Sediment Control

Erosion control measures would be implemented, including the use of straw wattles, silt fences/straw bale dikes, and straw bales to minimize erosion and collect sediment (to protect wildlife, no monofilament-covered sediment control measures would be used). Additional examples of erosion control measures that may be implemented include:

- Sand or gravel bags.
- Vegetative filter strips.
- Reseeding and restoration of the site.
- Maintenance of erosion control measures.
- Regular inspection and maintenance of erosion control measures.

Inspection and Startup Testing

Prior to operation, each completed turbine would be inspected and checked for mechanical, electrical, and control functions in accordance with the manufacturer's specifications before being released for startup testing. A series of startup procedures would then be performed by the manufacturer's technicians. Electrical tests on the transformers, underground power lines, and collector substations would be performed by qualified engineers, electricians, and test personnel to ensure that electrical equipment is operating within tolerances and that the equipment has been installed in accordance with design specifications. The aboveground power lines interconnecting to the PG&E system would be tested and inspected as required

Final Cleanup and Restoration

Clearing and disposing of trash, debris, and scrub from construction sites would be performed at the end of each workday through all stages of construction. Existing vegetation would be cleared only where necessary. All excavations would be backfilled with compacted earth and aggregate as soon as cable infrastructure is tested. Disposal of cuttings and debris would be in an approved facility designed to handle the waste.

Before construction is complete, all remaining trash and debris would be removed from the site. Any debris would be properly disposed offsite consistent with restoration requirements for nearby projects and described in a Reclamation Plan, which would be developed prior to construction as part of the construction planning and permitting process. Any material placed in the areas of the foundations or roads would be compacted as required for soil stability.

Traffic and Parking

Construction traffic routing would be established in a Construction Traffic Plan, which would include a traffic safety and signing plan prepared by Sand Hill in coordination with the County and other relevant agencies. The plan would define hours, routes, and safety and management requirements.

This plan would incorporate measures such as informational signs, traffic cones, and flashing lights to identify any necessary changes in temporary roadway configuration. Flaggers with two-way radios would be used to control construction traffic and reduce the potential for accidents along roads. Speed limits would be set commensurate with road type, traffic volume, vehicle type, and site-specific conditions to ensure safe and efficient traffic flow. Onsite construction traffic would be restricted to the roads developed for the proposed Project. Use of existing unimproved roads would be restricted to emergency situations.

During construction, oversized vehicles would deliver wind turbine generator and substation materials, heavy equipment, and other construction-related materials. Construction of the proposed Project components (roads, turbines, substation, and electrical and communication lines) would take place concurrently, using individual vehicles for multiple tasks. There would also be daily round trips of vehicles transporting construction personnel to the site.

Construction-related parking would be at construction staging areas. Carpooling would be used whenever possible.

After construction, O&M of the proposed Project would require fewer trips, consisting mostly of pickups or other light-duty trucks.

Operation and Maintenance Activities

Maintenance of turbines and associated infrastructure includes a wide variety of activities. Routine maintenance involves activities such as checking torque on tower bolts and anchors; checking for cracks and other signs of stress on the turbine mainframe and other turbine components; inspecting for leakage of lubricants, hydraulic fluids, and other hazardous materials and replacing them as necessary; inspecting the grounding cables, wire ropes and clips, and surge arrestors; cleaning; and repainting. Most routine maintenance activities are conducted in and around the tower and the nacelle. Cleanup from routine maintenance activities would be conducted at the time maintenance is performed by the O&M personnel. While performing most routine maintenance activities, O&M staff would travel by pickup or other light-duty trucks. In addition, nonroutine maintenance such as repair or replacement of rotors or other major components could be necessary. Such maintenance would involve use of one or more cranes and equipment transport vehicles.

Monitoring of Project operations would be computer-based; computers in the base of each turbine tower would be connected to the O&M facility through fiber-optic or wireless telecommunication links.

The O&M workforce would consist of turbine technicians, operations personnel, administrative personnel, and management staff. O&M staff would monitor turbine and system operation, perform routine maintenance, shut down and restart turbines when necessary, and provide security. All O&M staff would be trained regularly to observe BMPs. Approximately four to six full-time staff members would be required to conduct O&M activities.

Hazardous Materials Storage

Hazardous materials (e.g., fuel, lubricants, other oils) would be stored at the staging areas. The use of extremely hazardous materials is not anticipated. To minimize the potential for harmful releases of hazardous materials through spills or contaminated runoff, these substances would be stored within secondary containment areas in accordance with federal, state, and local requirements and permit conditions. Storage facilities for petroleum products would be constructed, operated, and maintained in accordance with the Spill Prevention Control and Countermeasures (SPCC) Plan that would be prepared and implemented for the proposed Project (Title 40 Code of Federal Regulations Part 112). The SPCC Plan would specify engineering standards (e.g., secondary containment); administrative standards (e.g., training with special emphasis on spill prevention, standard operating procedures, inspections); and BMPs.

A Hazardous Materials Business Plan (HMBP) would be developed for the proposed Project. The HMBP would contain specific information regarding the types and quantities of hazardous materials, as well as their production, use, storage, spill response, transport, and disposal.

Water and Wastewater Needs

Water for construction activities would be provided through an agreement with municipal or private suppliers. Temporary onsite water tanks and water trucks would be made available for fire water support, dust suppression, and construction needs. Daily water use would vary, depending on the weather conditions and time of year, both of which affect the need for dust control. Hot, dry, windy conditions would necessitate greater amounts of water. Tanker trucks would apply water to construction areas where needed to aid in road compaction and reduce construction-generated dust. A minimal amount of water would be required for construction worker needs (drinking water, sanitation facilities). This water would be trucked in or delivered as bottled drinking water. A local sanitation company would provide and maintain appropriate construction sanitation facilities. Portable toilets would be placed at each of the staging areas. When necessary, additional facilities would be placed at specific construction locations. Appropriate BMP training would be provided to truck operators to prevent runoff from dust suppression and control activities. Water used for cement mixing and truck washing would be managed in accordance with applicable permit conditions (and BMPs).

Although the proposed Project would require only a minimal amount of water on a temporary basis during construction, and an even smaller amount of water during operations for the O&M building, Sand Hill voluntarily prepared a water supply assessment (WSA) and submitted this assessment to the County. Water for construction (primarily for dust control) would be obtained from Zone 7 Water Agency, Byron-Bethany Irrigation District, the City of Livermore, or other approved water district or agency if available. Water for operations would be obtained from a groundwater source by installing an onsite well. The WSA concluded that there is an adequate water supply available to meet the needs of the proposed Project for both construction activities and operations.

Safety and Environmental Compliance Programs

Quality Assurance and Quality Control

A QA/QC program would be implemented by the applicant to ensure that construction and startup of the facility are completed as approved. Sand Hill would be responsible for ensuring implementation of the QA/QC program prior to construction. The program would specify implementing and maintaining QA/QC procedures, environmental compliance programs and procedures, and health and safety compliance programs and procedures, and would integrate activities with by all parties during Project construction. The engineering procurement and construction contractor and turbine supplier would be responsible for enforcing compliance with the construction procedures program for all of their subcontractors.

Environmental Compliance

Orientation of construction staff would include education on the potential environmental impacts of Project construction. The construction manager would establish procedures for staff to formally report any issues associated with the environmental impacts, to keep management informed, and to facilitate rapid response.

Stormwater Control

Because the Project would disturb more than 1 acre, it would require coverage under the state's General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order 2010-0014-DWQ) (Construction General Permit). Permit coverage would be obtained by submitting permit registration documents (PRDs) to the State Water Resources Control Board through its Stormwater Multiple Application and Report Tracking System website. The PRDs include a notice of intent, site maps, a stormwater pollution prevention plan (SWPPP), a risk level assessment, and other materials. The SWPPP would include the elements described in Section A of the Construction General Permit and maps that show the location and type of erosion control, sediment control, and non-stormwater BMPs, all of which are intended to prevent significant water quality impacts on receiving waters. The SWPPP would also describe site inspection, monitoring, and BMP maintenance procedures and schedules.

Safety Compliance

Sand Hill and its construction contractors and subcontractors would be responsible for construction health and safety issues. The contractor would provide a health and safety (H&S) coordinator, who would ensure that applicable laws, regulations, ordinances, and standards concerning health and safety are followed and that any identified deficiencies are corrected as quickly as possible. The H&S coordinator would conduct onsite orientation and safety training for contract and subcontract employees and would report back to the onsite construction manager. Upon identification of a health and safety issue, the H&S coordinator would work with the construction manager and responsible subcontractor or direct hire workers to correct the violation.

Emergency Situations

If severe storms result in a downed power line, standard O&M procedures would be applied. The turbines would be equipped with internal protective control mechanisms to safely shut them down in the event of a high-voltage grid outage or a turbine failure related to fire or mechanical problems. A separate low-voltage distribution service feed might be connected to the low-voltage side of the collector substations as a backup system to provide auxiliary power to Project facilities in case of outages. For safety, the collector substations would be fenced, locked, and properly signed to prevent access to high-voltage equipment. Safety signage would be posted around turbines, transformers, and other high-voltage facilities and along roads, as required.

Public Access and Security

The Project would be located entirely on properties with restricted public access. Only authorized access to the Project site would be allowed. The site is fenced and the collector substations would be fenced with an additional 12-foot-high chain-link fence to prevent public and wildlife access to high-voltage equipment. Safety signs would be posted in conformance with applicable state and federal regulations around all turbines, transformers, and other high-voltage facilities and along access roads. Vegetation clearance would be maintained adjacent to Project ingress and egress points and around the collector substations, transformers, and interconnection riser poles.

Hazardous Materials Storage and Handling

The County's Hazardous Materials Program Division is the Certified Unified Program Agency (CUPA) for all areas of Alameda County. Management of hazardous materials would be conducted in accordance with a County-approved HMBP developed for the proposed Project pursuant to the requirements of the CUPA. Hazardous materials used during O&M activities would be stored within the proposed O&M building in aboveground containers with appropriate spill containment features as prescribed by the local fire code or the SPCC Plan for the O&M building as stipulated by the appropriate regulatory authority. Such materials would be similar in type and amount to those currently stored and used for O&M for the existing facility.

Lubricants used in the turbine gearbox are potentially hazardous. The gearbox would be sealed to prevent lubricant leakage. The gearbox lubricant would be sampled periodically and tested to confirm that it retains adequate lubricating properties. When the lubricants have degraded to the point where they are no longer adequate, the gearbox would be drained, new lubricant added, and the used lubricants disposed of at an appropriate facility in accordance with all applicable laws and regulations.

Transformers contain oil for heat dissipation. The transformers are sealed and contain no polychlorinated biphenyls or moving parts. The transformer oil would not be subject to periodic inspection and does not need replacement.

O&M vehicles would be properly maintained to minimize leaks of motor oil, hydraulic fluid, and fuel. During operation, O&M vehicles would be serviced and fueled at the proposed O&M building (using mobile fuel tanks) or at an offsite location. No storage tanks are located at the existing project, and none are proposed.

Post-Project Decommissioning

The anticipated life of the windfarm is more than 30 years, as upgrading and replacing equipment could extend the operating life indefinitely with appropriate permit approvals. However, the life of the Project for CEQA purposes would be 35 years.

Decommissioning would involve removing the turbines, transformers, and related infrastructure in accordance with landowner agreements. Substations and meteorological (met) towers may be removed and the sites reclaimed; alternatively, the sites could be retained for continued use. A single large crane would be used to disassemble the turbines, and smaller cranes would lift the parts onto trucks to be hauled away. Generally, turbines, electrical components, and towers would either be refurbished and resold or recycled for scrap. All unsalvageable materials would be disposed at authorized sites in accordance with federal, state, and local laws, regulations, ordinances, and adopted policies in effect at the time of final decommissioning. Existing service roads would be used. Road reclamation would be accomplished using scrapers and gravel trucks. Site reclamation after decommissioning would be subject to a locally approved reclamation plan. Based on site-specific requirements, the reclamation plan would include regrading, spot replacement of topsoil, and revegetation of disturbed areas with an approved seed mix.

2.1.5 Required Approvals

Implementation of the Project may require discretionary actions and approvals from the following agencies.

Alameda County

- Consideration and Certification of a Final SEIR with appropriate Findings of Fact and Mitigation Monitoring and Reporting Program, if applicable, and approval of the Conditional Use Permits by the East County Board of Zoning Adjustments.
- Issuance of grading permits by the Grading Section of the Alameda County Public Works Agency.
- Minor roadway encroachment permits from the Alameda County Public Works Agency for transporting large pieces of equipment and other activities.
- Demolition Permit (for decommissioning activities) and Building Permit from Alameda County Building Inspection Department (Public Works Agency).

Other Responsible Agencies

- San Joaquin Regional Transit District may require roadway encroachment permits for transporting large pieces of equipment and other activities
- Caltrans may require special permit for the movement of vehicles and loads exceeding statutory size and weight limitations (California Vehicle Code Division 15).
- The U.S. Fish and Wildlife Service may require incidental take authorization under the Endangered Species Act for effects on species listed as threatened or endangered.
- The U.S. Army Corps of Engineers may require a Clean Water Act Section 404 permit or WaterQuality Certification (Section 401).

- FAA may require a Notice of Proposed Construction or Alteration; Determination of No Hazard.
- The California Department of Fish and Wildlife (CDFW) may require incidental take authorization under the California Endangered Species Act for effects on species listed as threatened and endangered.
- CDFW may require a Lake and Streambed Alteration Agreement if state jurisdictional streams may be affected.
- The State Water Resources Control Board will require a Construction General Permit for management of stormwater during decommissioning and construction activities, and a Notice of Intent as required under Clean Water Act Section 401.

2.2 Program-Level Updated Information

The Program Environmental Impact Report (PEIR), prepared pursuant to State CEQA Guidelines Section 15168, was certified on November 12, 2014. The PEIR represented a program-level evaluation of the planned repowering of the APWRA, with focused attention on two program alternatives of total buildout or complete repowering, either 417 MW (Alternative 1, based on the peak level of production capacity in Alameda County as of 1998, when a repowering program was first adopted by Alameda County) or 450 MW (Alternative 2, based on a modest increase of less than 10% in energy production over Alternative 1). The PEIR also incorporated project-level evaluation of two proposed repowering projects, the Golden Hills Wind Project proposed by Next Era Energy Resources and the Patterson Pass Project proposed by EDF Renewable Energy.

Since preparation of the PEIR, some changes have occurred that could affect the repowering program that was analyzed in the PEIR. The Notice of Preparation identified the following as program-level issues that the SEIR is intended to address:

- Wind Resource Area capacity.
- Changes in wind turbine technology.
- Latest science and monitoring results regarding avian and bat fatalities.
- An updated raptor conservation mitigation measure.
- Setback requirements.
- Federal Aviation Administration lighting requirements.
- Site development review.
- Avian Protection Plan and annual reporting requirement changes.
- The extent of temporary and permanent land disturbance.

These issues are described in more detail below.

2.2.1 Wind Resource Area Capacity

PEIR Assumptions

The PEIR identified two alternatives for repowering the APWRA, with separate buildout scenarios using either a limited level of 417 MW of generating capacity (Alternative 1), equal to the operating capacity that existed in 1998 when the County first approved a program for repowering the APWRA, or a maximum of 450 MW of capacity (Alternative 2), which represented a modest increase of less than 10% over Alternative 1. The PEIR analyzed both alternatives at an equal level of detail, and, because the County adopted and certified the PEIR without identifying a preferred alternative, the County may authorize wind energy development consistent with either alternative. The PEIR also analyzed two specific repowering projects, Golden Hills and Patterson Pass, and, for cumulative analysis purposes, identified four other potential or foreseeable future projects that could together generate about 358 MW (Table 2-6 in the PEIR, p. 2-47). Because these combined proposed and foreseeable projects would not have exceeded either alternative buildout in generating capacity, there was no evident need for the County when it certified the PEIR to impose a sequence, prioritization, or limit on projects to be considered in the future. Since the PEIR was certified and the Sand Hill Wind Project was proposed, County staff has concluded that, although the future projects identified in the PEIR should be considered in allocating the total nameplate capacity, subsequent projects would be reviewed on a first-come, first-served basis. The PEIR evaluated no more than 450 MW of production capacity. As shown in Table 2-6, the total gross MW of wind development resulting from the combined individual projects within the APWRA may ultimately exceed the 450 MW analyzed in the PEIR. Subsequent projects that would result in wind development beyond the 450MW capacity will be required to conduct subsequent environmental review to account for impacts not analyzed in the PEIR.

~~Approved and~~ Operational and Approved Projects

Since the PEIR was certified, one of the two projects that were evaluated at a project level in the PEIR and three of the four projects identified as “Other Future Projects” in the PEIR were modified to varying degrees. The Golden Hills Wind Project, described in the PEIR as proposed for 52 turbines of 1.7 MW each (88.4 MW total), was built instead with 48 turbines with a nameplate capacity of 1.79 MW each, thus yielding a total of 85.92 of MW installed or nameplate capacity. The second phase of the Golden Hills Wind Project, the Summit Wind Project, and the Sand Hill Wind Project are the anticipated future projects identified in the PEIR that have been modified since PEIR certification. The second phase of Golden Hills, later known as Golden Hills North, was projected as being composed of 24 turbines also with a nameplate capacity of 1.7 MW each, but was instead constructed of 20 turbines of 2.3 MW each, thus yielding 46 MW of capacity. The Summit Wind Project was identified in the PEIR as a 95 MW project, but it was approved in 2016 for a total of only 54 MW and is currently proposed to permit an additional 3.5 MW. The Sand Hill project, under its prior ownership (Ogin, Inc.), was projected to be only 34 MW and was later approved for 36 MW in 2016, but has since been replaced by the current 144.5 MW proposed Project. Table 2-6 provides an updated record of ~~approved,~~ operational, approved, and proposed repowering projects.

Due to changes in the actual construction or final approval of three of the six projects described in the PEIR, the combined potential generating capacity of these six projects would be reduced from the 358.2 MWs described in the PEIR to 321.7 MW.

The Rooney Ranch Project (which is under the separate jurisdiction and ownership of the City of Santa Clara), was recently approved for repowering with a nameplate capacity of 25.1 MW as shown in Table 2-6, with environmental analysis tiered under the PEIR. Although it was not listed specifically in the PEIR, this project was among the anticipated projects considered in the previous 1998 Program EIR for repowering the APWRA, and lies within the PEIR program area.

The 20.5 MW Diablo Winds project, a repowered project approved in 2003 and in operation since 2004, is listed in Table 2-6 because it is an operational project in the APWRA.~~,~~ ~~but, because~~Because it existed at the time of preparation of the PEIR, it was not included in the 450MW evaluated in the PEIR under Alternative 2. This project is included in Table 2-6 below, however, to identify~~demonstrate~~ the total wind development production potential within the APWRA.

~~a part of the baseline and not one of the projects evaluated in the PEIR~~.

Proposed Projects

~~The~~ As noted above, and reflected in Table 2-6 below, the Sand Hill Wind Project would add 108.5 MW of capacity beyond the~~at~~ previously approved amount (36 MW approved in 2016 when Sand Hill Wind LLC was owned by Ogin, Inc.), thereby increasing ~~that~~ the total APWRA MW capacity beyond what was analyzed in the PEIR~~to 430.2 MW~~. Also reflected in Table 2-6 is the 20.5MW Diablo Winds project described above, along with two additional projects for which applications were received since publication of the draft SEIR. The two recent applications include an expanded Summit Wind project and the Mulqueeny Ranch project, which will be subject to the preparation of a separate Subsequent EIR tiering from the PEIR.

Including all of the operational, approved, and proposed projects within the APWRA, the total program potential would be increased to 479.3 MW. Although this is more than the 450 MW of production capacity described in the PEIR as Alternative 2, the proposed project by itself would not result in the total capacity evaluated in the PEIR being exceeded. The analysis of cumulative impacts in Chapter 5 of this SEIR considers development of a total of 479.3 MW within the APWRA among the past, present and reasonably foreseeable projects contributing to cumulative impacts on various resources.~~Because this is less than the 450 MW of production capacity described in the PEIR as Alternative 2, the proposed Project would not result in the total capacity evaluated in the PEIR being exceeded.~~ As noted above, subsequent projects that would result in wind development beyond the 450MW capacity will be required to conduct subsequent environmental review to account for impacts not analyzed in the PEIR.

Table 2-6. Approved, Operational, and Proposed Projects in the APWRA

Project Name	Owner/Operator	CEQA Document Used or Anticipated to be Prepared (Status)	Total MW
Operating Prior to PEIR			
Diablo Winds	Glidepath	1998 EIR[a] (Operational since 2005)	**20.5**
Approved Projects			
Patterson Pass	EDF (now Centauri)	PEIR (Not yet operational)	19.8
Golden Hills	NextEra	PEIR (Operational)	85.9
Golden Hills North	NextEra	PEIR-Tiered (Operational)	46
Summit Wind	AWI (now Castlelake, LP)	PEIR-Tiered (Not yet operational)	54
Rooney Ranch[b]	sPower	PEIR-Tiered (Not yet operational)	25.1
Subtotal			**230.8**
Proposed Projects ~~(Subject of this SEIR)~~			
Sand Hill[e]	sPower	~~Pending/~~SEIR (this document)	144.5
Mulqueeney Ranch	Brookfield	~~Pending/~~SEIR Tiered from PEIR (Application Received October 2019)	80
Summit Wind - Amended[c]	AWI/Castlelake	Addendum to PEIR-Tiered Analysis (Application Received January 2020)	3.5
Subtotal			**228.0**
		Combined Gross Total MW	**479.3**

MW = megawatts

[a] The 1998 Program Repowering EIR is now considered superseded by the 2014 Program EIR.

[b] The Rooney Ranch Project proposed by sPower was approved by the City of Santa Clara on June 25, 2019.

[c] Summit Wind was approved for 27 "approximately 2.1 MW turbines" and a combined capacity of up to 54.0 MW (not calculated); however, since approval in 2016, the project has been revised with both fewer turbines (23, not 27) and larger capacity per turbine (2.5 MW instead of 2.1 MW). An application for a Modified CUP was received January 2020~~The Sand Hill Project was identified in the PEIR as a 34 MW potential project; it was subsequently approved in 2016 for up to 36 MW. It is currently proposed for 144.5 MW using additional and different parcels enabling an additional 108.5 MW of net capacity to be developed (i.e., 36 MW + 108.5 MW = 144.5MW)~~.

Potential Future Projects

~~The Mulqueeney Ranch project was listed in the PEIR as another future 80 MW project, and, although the County approved five meteorological masts in August 2015 for it, the County has not yet received a repowering application as of the preparation of this Draft SEIR. If an application is received in the future, the County would evaluate the proposal for consistency with the PEIR at that time.~~

In addition to the information provided in Table 2-6, County planning staff has received information from Clearway Energy (formerly NRG), which is planning a repowering project on portions of the Altamont Landfill. Because the number of MWs to be developed is not yet known, the Clearway project is not listed in Table 2-6. Environmental review under the PEIR would occur at a later date.

~~Remaining Wind Resource Capacity~~

~~As shown in Table 2-6, with approval of the proposed project, the level of wind energy generation approved under the PEIR would not exceed the 450 MW evaluated in the PEIR. Other future projects could be proposed which could exceed 450 MW, However, as stated above, the County will not approve a project that results in more than 450 MW of production capacity in the APWRA without additional CEQA review to address the cumulative environmental impacts that were not addressed in the PEIR.~~

2.2.2 Changes in Wind Turbine Technology

The PEIR analyzed projects with a range of turbine sizes. Table 2-7 shows the maximum dimensions of turbines in this range compared with the largest of three turbine types under consideration for the proposed Project.

Table 2-7. Turbine Specifications Contemplated in the PEIR and for Use with the Proposed Project

Turbine Model	PEIR Maximum—3.0 MW	General Electric—3.6 MW[a]
Rotor type	3-blade/horizontal axis	3-blade/horizontal axis
Blade length	62.5 m (205 ft)	67.2 m (220 ft)
Rotor diameter	125 m (410 ft)	137 m (449 ft)
Rotor swept area	12,259 m^2 (131,955 ft^2)	14,741 m^2 (158,671 ft^2)
Tower type	Tubular	Tubular
Tower (hub) height	96 m (315 ft)	81.5 m (267 ft)
Total height (from ground to top of blade)[b]	153 m (502 ft)	150 m (492 ft)
Blade height (from ground to bottom of blade)[c]	17.5 m (57 ft)	13.0 m (42.7 ft)

ft = feet; ft2 = square feet; m = meters; m2 = square meters; MW = megawatts.

[a] A 3.8 MW turbine and an as-yet-undetermined turbine with a capacity up to 4.0 MW have also been considered; however, the 3.6 MW turbine is larger in all dimensions than the 3.8 MW and the 4.0 MW turbines, and, therefore, is presented here as the largest of the proposed turbine types.

[b] Depending on the type of turbine and tower height used for the Project, total height could be up to 152 m (499 ft).

[c] The PEIR evaluated hub heights ranging from 80 to 96 meters and blade lengths ranging from 41.25 to 62.5 meters. Measurements assuming the lowest distance from the ground surface to the bottom of the blade tip are presented here.

As shown in Table 2-7, the proposed Sand Hill Wind Project turbines would be within most of the specifications established in the PEIR for rotor type, tower type, tower (hub) height, and total height. However, blade lengths would be up to 15 feet longer (by approximately 7%), rotor diameters up to 39 feet greater (an increase of about 9%, and due to a larger hub, more than two times the rotor length), and rotor swept area increased by up to 2,482 square meters (by roughly 20%).

Although a 3 MW turbine was the largest considered in the PEIR, for purposes of the analysis of avian mortality, the turbine used as the basis for developing estimates of future or typical project impacts in the PEIR was the Vasco Winds 2.3 MW turbine. The consequence of the increased nameplate capacity to a 3.6, 3.8 or even 4.0 MW turbine, however, could be lower impacts per MW for certain environmental topic areas. More specifically, impacts could be reduced because, as proposed for the Sand Hill Wind Project, 35 turbines rated at 4.0 MW each together with five 2.3 MW turbines would result in 144.5 MW of generating capacity, whereas the same capacity could only be reached through installation of 62 of the Vasco Winds-type turbines (2.3 MW each), thereby requiring considerably more land area and resulting in greater ground-disturbing activity to reach the same capacity.

2.2.3 Latest Science and Monitoring Results Regarding Avian and Bat Fatalities

New science and monitoring results acquired since certification of the PEIR in 2014 and used in the impact analysis presented here consists of the following:

- Second- and third-year monitoring studies for the Vasco Winds project, and corrected bat mortality estimates for all three years of monitoring at the project (Brown et al. 2016).
- First- and second-year monitoring studies for the Golden Hills project, including use of more frequent surveys and surveys using dogs (H. T. Harvey & Associates 2018a, 2016b).
- Golden eagle satellite tracking study results for the APWRA (Bell 2017).
- Biological baseline studies for golden eagles in the APWRA (Wiens et al. 2015, Kolar and Wiens 2017).
- Micrositing study for a prior Sand Hill project with a different applicant (Smallwood and Neher 2016b).
- Micrositing study for the Summit Winds project (Smallwood and Neher 2016c).
- Micrositing studies for the Golden Hills project (Smallwood and Neher 2015b, 2015c, 2017; Smallwood 2018).
- Micrositing studies for the proposed Sand Hill project (Smallwood and Neher 2018, Estep 2019).

These data sources are cited and discussed in the analysis of biological resource impacts (Chapter 3, Section 3.4.2).

The Golden Hills monitoring effort indicates potentially higher mortality rates than those estimated in the PEIR, particularly for golden eagles and red-tailed hawks. However, as explained in detail in the discussion of Impact BIO-11 in Section 3.4.2, *Environmental Impacts*, these results do not indicate new or more severe significant effects beyond those anticipated in the PEIR because the significant and unavoidable impact conclusion of the PEIR correctly anticipated that results from repowering project monitoring have shown mortality rates for any given species to be quite variable between repowering projects, even if they are consistent in showing reduced fatalities relative to non-repowered projects. The PEIR analyzed effects on avian and bat species using information on multiple repowered projects collected over multiple years, noting that “fatality rates in the APWRA are highly variable (that is because they differ across years, turbine types, geographies, and topographies).” Consequently, the new information on avian and bat fatalities from only 2 years of monitoring a single project during abnormally wet years within the larger APWRA cannot be extrapolated to conclude decisively that the proposed Project or repowered wind turbines overall would result in new significant effects or a substantial increase in the severity of effects. A body of information spanning multiple projects and multiple years of monitoring is necessary to form conclusions regarding the effects of repowering with fourth-generation turbines as represented by the proposed Project. That analysis is provided in Section 3.4.2, *Environmental Impacts*.

Future wind energy proposals will be required to incorporate the latest research available at the time their application is deemed complete, in the same manner as Sand Hill is obligated through this SEIR to incorporate the most current avian monitoring reports of individual projects, as well as other population and mortality studies that have been prepared.

2.2.4 Updated Raptor Conservation Mitigation Measure

One of six strategies or components collectively identified in the PEIR as Mitigation Measure BIO-11h (*Compensate for the loss of raptors, including golden eagles, by contributing to conservation efforts*) provided for funding of local or regional conservation efforts, based on reported costs for rehabilitating the typical injured raptor (indicated as $580/raptor fatality in the PEIR based on interviews with staff at the University of California, Davis Raptor Center). The County has modified Mitigation Measure BIO-11h so that now, or after any initial 10-year period, projected costs are adjusted for inflation according to the Consumer Price Index. Such adjustment would occur on the tenth anniversary of commercial operations, or (in the case of a request to revise it during the 10-year period) at the time that a monitoring report is accepted by the Planning Director showing a change in total raptor fatalities for the project. Both the proposed Project and future projects require implementation of BIO-11h, which provides, as noted above, a range of strategies for contributing to raptor conservation.

2.2.5 Setback Requirements

Table 2-2 in the PEIR established setback requirements for repowered wind turbines and identified "General Setbacks" and "Alternative Minimum" setbacks. Since the PEIR was certified, the County encountered some criticism that the "General Setback" requirements were being "compromised" by use of the "Alternative Minimum" setbacks. In order to provide more clarity, Table 2-8 is proposed to replace and update PEIR Table 2-2, to emphasize that two distinct setback options are available for the siting of each turbine relative to adjacent land uses or infrastructure corridors. These options include a Standard Minimum Setback for which there are no special conditions (referred to as the General Setback in Table 2-2 in the PEIR), and a Reduced Optional Setback that is conditional on the submittal and approval of notarized agreements and/or blade-throw studies (identified as the Alternative Minimum in Table 2-2). These changes to the terms of reference and other updates to the setback table are meant to more clearly indicate where supporting studies of blade throw, noise, or shadow flicker studies are required.

In broad terms, the last column in PEIR Table 2-2, Alternative Minimum, has been functionally moved to the left for direct comparison to the Standard Minimum, but no setback dimension is changed by Table 2-8. The repositioned column and descriptive text are also split into specific distance criteria and the type of documentation required as a condition of the Reduced Optional Setback. The setback adjustment for height or elevation differences, which is required under either option and was in a central column in PEIR Table 2-2, is now in the last column position. Several other revisions or clarifications are made to the setbacks table, including the following:

- The setback for adjacent parcels with approved wind energy Conditional Use Permits (CUPs) is clarified to include planned wind energy CUPs (the footnote in the original table clearly inferred such an intent); the footnote is updated to enable validation of such plans or their legitimacy.

Table 2-8. Alameda County Turbine Setback Requirements

Affected Land Use or Corridor Type	Standard Minimum Setback, without Conditions	Reduced Optional Setback, with Conditions[a]		Setback Adjustment for Turbine Elevation above or below Affected Use[b]
		Distance	Conditional Requirement	
Adjacent parcel with approved or planned wind energy CUP[c]	1.1 times rotor length	0.55 times rotor length	Notarized agreement or easement	1% of TTH added or subtracted per 10 ft. of turbine elevation, respectively, above or below affected parcel
Adjacent parcel without approved wind energy CUP	1.25 times TTH	1.1 times rotor length	Notarized agreement or easement	1% TTH per 10 ft above or below affected parcel
Adjacent dwelling unit[d]	3 times TTH	1.5 times TTH	Notarized agreement or easement and Blade-Throw Study	1% TTH per 10 ft above or below affected unit
Public road (including Interstate 580, other highway, and passenger rail line right-of-way), trail, commercial or residential zoning	2.5 times TTH	1.25 times TTH	Blade-Throw Study	1% TTH per 10 ft above or below affected right-of-way or zone district
Recreation area (property boundary)	1.25 times TTH	1.0 times TTH	Blade-Throw Study	1% TTH per 10 ft above or below property line
Transmission line (center conductor line)	2 times TTH	1.0 times TTH	Blade-Throw Study	1% TTH per 10 ft above or below path of conductor line at ground level

TTH = total turbine height: the height to the top of the rotor at 12:00 position. Setback distance to be measured horizontally from center of tower at ground level without adjustment for slope; ft = feet; CUP = Conditional Use Permit.

[a] Reduced Optional Setback is the minimum distance, proportionate to rotor length or TTH as indicated, that is required for turbines approved with a Conditional Use Permit, and which require, in addition to any adjustment for elevation (see last column), prior to approval of the building permit, either: a) a notarized agreement or recorded wind easement on the affected property, subject to Planning Director approval; or b) a Blade-Throw Study prepared by a qualified professional engineer, subject to approval by the Planning Director, who may request an independent third-party engineering consultant to review such Study and who may also refer the Study and third-party review to the Director of Public Works for a recommendation regarding the Study and/or review. In the case of a residential use that is less than 3 times TTH, both a notarized agreement or recorded wind easement, and a Blade-Throw study are required.

[b] Any setback based on TTH will be increased or reduced, respectively, based on whole 10-foot increments in the ground elevation of the turbine above or below an affected parcel, dwelling unit, road right-of-way, or transmission corridor conductor line. Any portion of a 10-foot increment in ground elevation will be disregarded (or rounded down to the nearest 10-foot interval).

[c] No setback from parcel lines is required within the same wind energy CUP boundary. Knowledge of planned or proposed wind energy CUPs on adjacent parcels to be based on best available information at the time the subject application is deemed complete. The validity or suitability of an adjacent property for a wind energy CUP will be determined by the Planning Director who may request verification from the property owner.

[d] Any turbine located less than 500 meters (approximately 1,540 feet) in a generally east or west direction (within the solar declination of approximately 47°) from a residence shall be subject to an additional requirement for preparation of a shadow flicker analysis as required by Mitigation Measure AES-5, defined in detail in the PEIR. Distance to residence shall be to the nearest exterior wall of a residence, or if specified by the residence in the agreement or easement, to a 2-acre building envelope, subject to approval by the Planning Director.

- The “Public road” setback row is amended to include other highways (for general clarity) and any passenger rail line, because a regular commuter rail line traverses the central APWRA.
- The point from which setbacks from recreation areas are measured is clarified to refer to the property line.
- The basis for determining setbacks from transmission lines is simplified by referring only to the center conductor line, and eliminating any footnote.
- The setback to a residence includes consideration of shadow flicker studies that may be required and allows a 2-acre building envelope to be established as the basis for setback distance.
- Percentages (used only under “Alternative Minimum”, and now applicable to the “Reduced Optional Setback”) are converted to specific factors (e.g., 0.55 × rotor length, 1.5 × total turbine height).

The County considers the addition of a setback to a passenger rail line to be the most consequential aspect of the update to the setbacks table, other than clarification of when specific documentation is required as a condition of a wind energy CUP approval.

2.2.6 Federal Aviation Administration Lighting Requirements

The County notes that although the PEIR stated that nighttime lighting for repowered turbines would be similar to the lighting of previously existing turbines, because the number of turbines would be far fewer than the number of existing turbines (at the time of the PEIR certification) in fact the new turbines have FAA-mandated lighting that differs observably from the lighting appearing on the previously existing turbines. Because the first- and second-generation turbines were all under 200 feet in height, almost no FAA lighting was required, and thus, for the repowered Golden Hills and Golden Hills North project areas, nighttime lighting of each individual turbine is more noticeable. Although the County does not have the ability to limit the placement of required FAA lighting, it is understood that the FAA may have some discretion to not require every turbine to provide nighttime lighting for aesthetic reasons.

2.2.7 Site Development Review

The requirements for site development review, identified as mitigation measure AES-2a in the PEIR, indicated review applied to “new turbines along ridgelines or hilltops that have not previously been developed with commercial-scale wind turbines…” (PEIR p. 3.1-16, Mitigation Measure AES-2a).

However, the text in the PEIR states clearly enough to indicate that, on balance, significant aesthetic impacts would also result and Mitigation Measure AES-2a would be required when turbines were proposed in certain other areas where they did not exist at the time that the NOP for the PEIR was circulated in 2010. The PEIR states, “Placement of new turbines on undeveloped portions of the program area would introduce large structures where none presently exist, altering the undeveloped character of these parcels,” in contrast to its immediately preceding discussion that states most succinctly, “While the larger turbines would draw viewers’ attention toward them, the eye is also able to follow the ridgeline of the hills in a more cohesive manner than existing conditions” (PEIR p. 3.1-15 to 16). This SEIR clarifies that Mitigation Measure AES-2a, *Require site development review*, applies, as described in the PEIR, to projects that would involve the placement of new turbines in “undeveloped portions of the program area,” including those areas where turbines once existed but were not in existence at the time the NOP for the PEIR was circulated. In general, where views of the old generation turbines would be replaced with views of new generation turbines, the trade-off was deemed to be either beneficial or a less-than-significant impact; in contrast, the impact on views toward areas in which no turbines were then in place, including views from scenic routes defined by the County's General Plan, recreation areas, and trails would be potentially significant.

Mitigation Measure AES-2a (applicable to Program Alternatives 1 and 2) is thus clarified: "New turbines along ridgelines or hilltops that have not previously been developed with commercial-scale wind turbines, *or where wind turbines were not part of the visual baseline as of 2010* will not be allowed, unless a separate Site Development Review is completed…" (added text in italics). The remainder of Mitigation Measure AES-2a is unchanged. Site development review would involve review of distance from public viewpoints (typically 2,000 feet or less), intervening terrain, screening landscaping, and proposals for compensatory improvements to equivalent and nearby scenic features (typically within a radius of 1 mile) to be approved by the Planning Director.

2.2.8 Avian Protection Plan and Annual Reporting Requirement Changes

Conditions of approval for previous projects, including those approved at the time the PEIR was certified, and those approved since that time (e.g., Golden Hills North, Summit Wind), required the annual monitoring to be initiated at the time of commercial operation. In the case of Golden Hills, the initiation of monitoring activities and preparation of the Avian Protection Plan (APP) was delayed for various reasons, including that the Technical Advisory Committee (TAC) had not yet convened in order to review and approve it. The standard conditions of approval required each project proponent to submit a draft project-specific APP to the County within 10 days of submitting the Building Permit application. Although it is recognized that unforeseen delays may necessitate delays in commencing monitoring, because the TAC has greater experience in reviewing project APPs, it is the County's expectation that proponents of the proposed Project and of future projects will be better able to obtain approval of monitoring protocols from the TAC, and, equally, project proponents will have better understanding of what is required for each APP that is submitted near the time of its Building Permit application.

2.2.9 Changes in Disturbance Estimates

Comments were made at the time the EA was prepared that the generic project disturbance estimates in the PEIR could differ from impacts that actually occur, not for total impacts, but for temporary impacts, if restoration and revegetation of temporarily disturbed areas was not successful. For each subsequent project under the PEIR, including this project, disturbance estimates are based on the specific project layout, and not on the generic project disturbance estimates. In addition, PEIR mitigation measures require monitoring of restoration and revegetation success. For these reasons, no change would result at the program level.

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Chapter 3
Impact Analysis

Introduction

This chapter provides environmental analyses of the physical impacts that could result from approval and implementation of the Sand Hill Wind Project (Project). The chapter is organized into separate sections for each resource analyzed, as listed below. Each section provides a description of the environmental and regulatory setting, significance criteria and methodology used in the impact analysis, and the potential impacts and required mitigation measures. For each potential impact, the impacts of the proposed Project are presented.

Project Approach

The specific characteristics of the Project are considered in the assessment of the project-level impacts of the proposed Project in each of the CEQA topic sections.

Chapter Organization

This chapter is organized into the following sections.

- 3.1, *Aesthetics*
- *3.2, Agricultural and Forestry Resources*
- 3.3, *Air Quality*
- 3.4, *Biological Resources*
- 3.5, *Cultural Resources*
- 3.6, *Energy*
- 3.7, *Geology, Soils, Mineral Resources, and Paleontology*
- 3.8, *Greenhouse Gas Emissions*
- 3.9, *Hazards and Hazardous Materials*
- 3.10, *Hydrology and Water Quality*
- 3.11, *Land Use and Planning*
- 3.12, *Noise*
- 3.13, *Population and Housing*
- 3.14, *Public Services*
- 3.15, *Recreation*
- 3.16, *Transportation*
- 3.17, *Tribal Cultural Resources*
- 3.18, *Utilities and Service Systems*
- 3.19, *Wildfire*

Program-Level Updated Information

Chapter 2, *Project Description*, describes updates to information that was provided in the PEIR on a variety of topics, and which may be useful for analysis of the Project and for future projects anticipated to be proposed and reviewed under the PEIR (with tiering pursuant to CEQA). These topics, outlined before in the Notice of Preparation for the SEIR, follow below. For each topic, a brief discussion is provided as to how the updated information in Chapter 2 may or may not result in any different, new, or more severe environmental impacts as compared with the PEIR analyses. This discussion informs the analysis in the SEIR. No physical impacts would result or are foreseeable as a result of updated program information as described in Chapter 2, because the updates only clarify information in the PEIR.

Wind Resource Area Capacity

The PEIR evaluated two alternatives for repowering the APWRA. Alternative 1 provided for a limited level of repowering with 417 megawatts (MW) of generating capacity, equal to the operating capacity that existed in 1998 when the County first approved a program for repowering the APWRA. Alternative 2 provided for a maximum buildout of 450 MW of capacity, which represented a modest increase of less than 10% percent over Alternative 1. Both alternatives were evaluated at an equal level of detail. Because the County adopted and certified the PEIR without identifying a preferred alternative, the County is able to approve wind energy development consistent with either alternative. As discussed at length in Chapter 2, the total program potential would be increased to 479.3 MW taking into consideration all of the operational, approved, and proposed projects within the APWRA. Although this is more than the 450 MW of production capacity described in the PEIR as Alternative 2, the proposed project by itself would not result in the total capacity evaluated in the PEIR being exceeded. ~~t~~The County will not approve a project that results in more than 450 MW of production capacity in the APWRA without additional CEQA review, such as an EIR, to address the cumulative environmental impacts that were not addressed in the PEIR. The analysis of cumulative impacts in Chapter 5 of this SEIR considers development of a total of 479.3 MW within the APWRA among the past, present and reasonably foreseeable projects contributing to cumulative impacts on various resources. ~~The capacity of the APWRA for development of wind energy would not change or decrease as a result of the Project or as a consequence of the updated information being provided, because the existing and currently approved projects, when combined with the Project, would not exceed 450 MW.~~

Changes in Wind Turbine Technology

As discussed in Chapter 2, the proposed Project includes newer model turbines that have longer blades and a higher MW capacity than those described in the PEIR, including the specific project proposals for Golden Hills Wind (1.7 MW turbines) and Patterson Pass Wind (2.4 to 3.3 MW turbines), as well as for the program alternatives (1.6 to 3.0 MW turbines). However, the PEIR indicated that, in comparing smaller MW turbines with the largest anticipated turbines (1.6 versus 3.0 MW turbines, in Table 3-2 of the PEIR, p. 3-2), permanent land area disturbed with the larger turbines (estimated at 363 acres for buildout of Alternative 1) would be only about 55% of the area disturbed with 1.6 MW turbines (estimated at 659 acres). Therefore, the Project, and any other future projects for which large turbines may be proposed, could be expected to result in proportionally even less disturbed land area on a per MW basis. However, a measurable or tangible reduction in disturbed area assumes that a hypothetical project site has the physical area with the potential to use either many more smaller turbines (e.g., 1.6 to 2.0 MW capacity each) or instead achieve the same MW objective with perhaps half as many larger turbines (e.g., 3.0 to 4.0 MW capacity each).

Some program impacts identified in the PEIR for road infrastructure, laydown areas and underground collection lines and other activities resulting in ground disturbance were evaluated on a per MW basis, as specifically described in Chapter 3 of the PEIR and incorporated by reference here. The consequence of the increase to a turbine with a nameplate capacity of 3.6, 3.8, or even 4.0 MW, therefore, is expected to be lower impacts per MW for ground-disturbing activities, compared with the hypothetical use of many more of the smaller turbines, such as those of less than 2.0 MW in nameplate capacity, to achieve the same project generating capacity.

For some other critical subject areas of the SEIR, especially the mortality of avian and bat species, the impact is determined directly on a per MW basis, such that, assuming the relationship of MWs to avian mortality remains constant (e.g., 0.64 annual raptor fatalities per MW, such as reported for Vasco Winds in the PEIR), the result would be higher fatalities per turbine. As indicated in Chapter 1, *Introduction*, and Chapter 2 and in the analysis of avian and bat mortality in Section 3.4, *Biological Resources*, however, each repowering project previously approved in the APWRA, in either Alameda or Contra Costa Counties, has had widely varying results in avian mortality rates. The mortality rate per MW of the Project, or of any other future repowering project, may be expected to also vary.

Therefore, changes in wind turbine technology are not anticipated to result in additional or substantially more severe impacts at a program level than those presented in the PEIR, and, for this reason, the type or technology of turbines that may be developed under the County's repowering PEIR is not further analyzed in the SEIR. The specific characteristics of the Project are considered in each of the CEQA topic sections.

Latest Science and Monitoring Results Regarding Avian and Bat Fatalities

Since certification of the PEIR in 2014 and construction and commencement of operations of Golden Hills, the first repowering project completed as part of the overall APWRA repowering effort, two final monitoring reports and one draft monitoring report have been published regarding avian and bat fatalities due to wind repowering: a final report of the Vasco Winds project in Contra Costa County (Brown, et al. 2016), the *Golden Hills Wind Energy Center Postconstruction Fatality Monitoring Report: Year 1*, and, more recently, the draft *Golden Hills Monitoring Report: Year 2* (H. T. Harvey & Associates December 2018b). The two Golden Hills monitoring reports describe the monitoring effort and analysis of those results, specifically that the monitoring effort indicated potentially higher mortality rates than those estimated in the PEIR, particularly for golden eagles and red-tailed hawks. However, as explained in detail in the discussion of Impact BIO-11 in Section 3.4.2, *Environmental Impacts*, these results do not indicate new or more severe significant effects beyond those anticipated in the PEIR. The PEIR's estimates of avian mortality were based on the first-year monitoring study of the Vasco Winds project, and on studies of older projects with relatively smaller turbines (such as the Diablo Winds project composed of thirty-one 0.66 MW turbines and the Buena Vista project of thirty-eight 1.0 MW turbines). Thus, the turbine sizes on which mortality is estimated have been relatively diverse. Furthermore, the research and mortality detection techniques have varied widely, as has the topography for each project. As a result, the available avian and bat mortality reports on repowered turbines are not indicative of any definitive trend or suited for making different conclusions about repowered turbines in general.

Additional science has been published that supports the analysis of avian and bat monitoring results. This work includes the following sources.

- Rodhouse et al. (2019) provide new information regarding potential population-level impacts of wind power and other stressors on little brown bat and hoary bat.
- Smallwood and Bell (2019) provide evidence that bat mortality estimates utilizing detection dogs may still underestimate bat fatalities.
- Smallwood et al. (2019) provide the results of a study performed in the APWRA underscoring the importance of the use of trained detection dogs in mortality detection surveys.
- Wiens and Kolar (2019) provide new information regarding long-term adverse effects of APWRA development on the local area golden eagle population.

Future wind energy proposals to be reviewed through CEQA will require either a checklist or other type of CEQA document, which will have to incorporate the latest avian mortality monitoring reports that are available. It is expected that understanding of the interaction of turbines with birds, including both raptor- and non-raptor species, and with bats, will improve with each new monitoring report. However, it is also anticipated that additional changes in survey protocols, detection probability, analysis methods, prevailing weather conditions, or topography may result in different outcomes compared with the results in reports that are currently available. Therefore, although the currently available reports are useful for assessing the Project as the subject of this SEIR, and will contribute to analysis of the future projects, they should not be considered to provide definitive or conclusive determinations about future mortality rates for birds and bats.

Updated Raptor Conservation Mitigation Measure

Since certification of the PEIR, efforts to implement the PEIR mitigation measure providing for contributions by project proponents to raptor conservation efforts, based on rehabilitation cost estimates provided by the University of California Davis Raptor Center (one of six varying strategies to contribute to such efforts, under Mitigation Measure BIO-11h, p. 3.4-115 in the PEIR) has had some limited success. Updating or revising how rehabilitation costs are determined may be improved in the future, along with identification of other appropriate raptor mitigation or research and raptor recovery and rehabilitation programs (as described as the sixth and last potential strategy in the PEIR – *Other Conservation Measures Identified in the Future*). The current update to the mitigation measure, ensuring that the cost estimate is adjusted now and in the future for inflation, is described in Section 2.2.4 and in Section 3.4, *Biological Resources*. These updated terms would apply to the Project if its proponents propose to make contributions based on the Project's projected raptor fatalities, as well as to other future wind repowering projects if those applicants choose this option. Although the change in this mitigation measure would improve and increase the funding of raptor conservation efforts, it would not eliminate the significant and unavoidable impacts of repowering concerning raptor mortality. The consequence of this update to the mitigation measure, therefore, would not affect any specific project or program impact on the environment, including on biological resources, or the means by which the impact is identified or determined, and does not require additional analysis in the SEIR.

Setback Requirements

The County's setback requirements as presented in the PEIR (pp. 2-13 to 2-14) reflected the County's standard minimum setbacks that were deemed appropriate with supporting studies of blade throw, noise, or flickers, as needed according to the affected land use, roadways, or utility infrastructure to ensure land use compatibility. The changes made to PEIR Table 2-6 are provided in Table 2-8 in Section 2.2.5 of this SEIR. The changes in the presentation of the County's setback requirements do not change any actual setback dimension or the key requirements for appropriate studies, but provide more clarity regarding where agreements, wind easements, or studies are required. For these reasons, the changes would not result in any different environmental impact for the Project or for any future repowering project and do not require additional analysis in the SEIR.

Federal Aviation Administration Lighting Requirements

The Federal Aviation Administration (FAA) requirements have not changed since certification of the PEIR. For this reason, no additional impacts would result at a program level, and this topic is not further analyzed in this document.

Site Development Review

The applicability of the site development review requirement in the PEIR to projects is clarified in Sections 2.2.7 and 3.1. The PEIR's analysis of the visual impacts of the construction of new repowered turbines in the APWRA at a program level focused its attention on ridgelines specified in Policy 105 of the *East County Area Plan* such as above Vasco Road or surrounding Brushy Peak, which had the potential to be developed with new turbines. The analysis also noted that new turbines on undeveloped portions of the program area would alter the character of parcels in such areas, and identified area residents and recreational users in the area as having the most sensitivity to new adverse visual impacts. For this reason, construction of new turbines in areas where they did not exist at the time the PEIR was prepared is understood by the County to be a potentially significant impact, as indicated in the PEIR (p. 3.1-15), and the requirement for site development review applies to views from scenic routes established by the County's General Plan, and from recreational areas and trails. Areas that are deemed exempt from the requirement for site development review are those in which new turbines would replace older and many concentrated turbines that existed in specific views over most of the past 30 years. This change is reflected in 2019 Updated PEIR Mitigation Measure AES-2a, *Require site development review*. However, although this clarification would apply to both the Project and potentially to other future repowering projects with similar situations, the change would not result in any new program-level impacts.

Avian Protection Plan and Annual Reporting Requirement Changes

The Project and all repowering projects will be expected to have their Avian Protection Plan (APP) and related monitoring program in draft status at the time of building permit application. Delays in obtaining County and Technical Advisory Committee (TAC) approval of the APP and monitoring are expected to be substantially reduced because of the experience that the TAC has acquired since the PEIR was certified. The Project and other future repowering projects will be expected to initiate monitoring closer to the date of commercial operations than had occurred with the previous projects. Changes in the timing requirements for annual reporting would have no physical effects, would not result in changes in the types of data provided, and would not change impacts at a program level. For this reason, the impacts of changes in the timing requirements for annual reporting at a program level are not further analyzed in this SEIR.

Changes in Disturbance Estimates

As indicated in Chapter 2, no change would result at the program level; therefore, no program impacts are evaluated in this SEIR.

Summary of Program Changes Approach

No physical impacts would result from, or are foreseeable as a result of, updated program information as described in Chapter 2, *Project Description*, because the updates only clarify information in the PEIR.

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Rodhouse, Thomas J., Rogelio M. Rodriguez, Katharine M. Banner, Patricia C. Ormsbee, Jenny Barnett, and Kathryn M. Irvine. 2019. Evidence of region-wide bat population decline from long-term monitoring and Bayesian occupancy models with empirically informed priors. Ecology and Evolution, DOI 10.1002/ece3.5612.

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3.1 Aesthetics

This section identifies and evaluates issues related to visual resources in the Project areas. It also describes impacts on these resources that could result from implementation of the Project. Mitigation measures are prescribed where feasible and appropriate.

3.1.1 Concepts and Terminology

Identifying a Project area's visual resources and conditions involves three steps.

1. Objective identification of the visual features (visual resources) of the landscape.
2. Assessment of the character and quality of those resources relative to overall regional visual character.
3. Determination of the importance to people, or *sensitivity*, of views of visual resources in the landscape.

The aesthetic value of an area is a measure of its visual character and quality, combined with the viewer response to the area (Federal Highway Administration 1988). Scenic quality can best be described as the overall impression that an individual viewer retains after driving through, walking through, or flying over an area (U.S. Bureau of Land Management 1980). Viewer response is a combination of viewer exposure and viewer sensitivity. Viewer exposure is a function of the number of viewers, number of views seen, distance of the viewers, and viewing duration. Viewer sensitivity relates to the extent of the public's concern for a particular viewshed. These terms and criteria are described in detail below.

Visual Character

Natural and artificial landscape features contribute to the visual character of an area or view. Visual character is influenced by geologic, hydrologic, botanical, wildlife, recreational, and urban features. Urban features include those associated with landscape settlements and development, including roads, utilities, structures, earthworks, and the results of other human activities. The perception of visual character can vary significantly seasonally, even hourly, as weather, light, shadow, and elements that compose the viewshed change. The basic components used to describe visual character for most visual assessments are the elements of form, line, color, and texture of the landscape features (U.S. Forest Service 1995; Federal Highway Administration 1988). The appearance of the landscape is described in terms of the dominance of each of these components.

Visual Quality

Visual quality is evaluated using the well-established approach to visual analysis adopted by Federal Highway Administration, employing the concepts of vividness, intactness, and unity (Federal Highway Administration 1988; Jones et al. 1975), which are described below.

- Vividness is the visual power or memorability of landscape components as they combine in striking and distinctive visual patterns.

- Intactness is the visual integrity of the natural and human-built landscape and its freedom from encroaching elements; this factor can be present in well-kept urban and rural landscapes, and in natural settings.
- Unity is the visual coherence and compositional harmony of the landscape considered as a whole; it frequently attests to the careful design of individual components in the landscape.

Visual quality is evaluated based on the relative degree of vividness, intactness, and unity, as modified by its visual sensitivity. High-quality views are highly vivid, relatively intact, and exhibit a high degree of visual unity. Low-quality views lack vividness, are not visually intact, and possess a low degree of visual unity.

Visual Exposure and Sensitivity

The measure of the quality of a view must be tempered by the overall sensitivity of the viewer. Viewer sensitivity or concern is based on the visibility of resources in the landscape, proximity of viewers to the visual resource, elevation of viewers relative to the visual resource, frequency and duration of views, number of viewers, and type and expectations of individuals and viewer groups.

The importance of a view is related in part to the position of the viewer to the resource; therefore, visibility and visual dominance of landscape elements depend on their placement within the viewshed. A viewshed is defined as all of the surface area visible from a particular location (e.g., an overlook) or sequence of locations (e.g., a roadway or trail) (Federal Highway Administration 1988). To identify the importance of views of a resource, a viewshed must be broken into distance zones of foreground, middleground, and background. Generally, the closer a resource is to the viewer, the more dominant it is and the greater its importance to the viewer. Although distance zones in a viewshed may vary between different geographic region or types of terrain, the standard foreground zone is up to 0.25–0.5 mile from the viewer, the middleground zone from the foreground zone to may extend 3–5 miles from the viewer, and the background zone from the middleground to infinity (Jones et al. 1975).

Visual sensitivity depends on the number and type of viewers and the frequency and duration of views. Visual sensitivity is also modified by viewer activity, awareness, and visual expectations in relation to the number of viewers and viewing duration. For example, visual sensitivity is generally higher for views seen by people who are driving for pleasure, people engaging in recreational activities such as hiking, biking or camping, and homeowners. Sensitivity tends to be lower for views seen by people driving to and from work or as part of their work (U.S. Forest Service 1995; Federal Highway Administration 1988; U.S. Soil Conservation Service 1978). Commuters and nonrecreational travelers generally have fleeting views and tend to focus on commute traffic, not on surrounding scenery; therefore, they are generally considered to have low visual sensitivity. Residential viewers typically have extended viewing periods and are concerned about changes in the views from their homes; therefore, they are generally considered to have high visual sensitivity. Viewers using recreation trails and areas, scenic highways, and scenic overlooks are usually assessed as having high visual sensitivity.

Judgments of visual quality and viewer response must be made based in a regional frame of reference (U.S. Soil Conservation Service 1978). The same landform or visual resource appearing in different geographic areas could have a different degree of visual quality and sensitivity in each setting. For example, a small hill may be a significant visual element on a flat landscape but have very little significance in mountainous terrain.

3.1.2 Existing Conditions

Regulatory Setting

Federal

The federal government does not explicitly regulate visual quality but recognizes its importance and preserves aesthetic values through the National Park, National Wildlife Refuge, National Monument, and National Scenic Byway Systems.

State

Within Alameda County and in the APWRA, Interstate 580 (I-580) from the San Joaquin County line to State Route (SR) 205 (Post Miles 0.0 to 0.393), a 0.4-mile long segment, is a state-designated scenic highway (California Department of Transportation 2011). The I-580 intersection with SR 205 falls just within the eastern border of the program area, and approximately 1.5 miles east of the Project site where it borders I-580.

Local

Alameda County General Plan

Scenic Route Element

The Scenic Route Element of the *Alameda County General Plan* (Scenic Route Element) provides a continuous, countywide scenic route system and is intended to serve as a guide for local jurisdictions for development of city-scale scenic route systems and as a guide for development to protect and enhance the scenic values along designated scenic routes (Alameda County 1966).

The Scenic Route Element identifies scenic freeways and expressways as traversing or connecting areas of major scenic, recreational, or cultural attractions, and as distinct from two other major types of scenic routes (scenic thoroughfares and rural-recreation routes). Scenic routes are defined to consist of three elements: the right-of-way, the scenic corridor, and areas extending beyond the corridor. The corridor is defined as those properties, along and up to 1,000 feet beyond the right-of-way, that either (1) should be acquired for protection, or (2) for which development controls should be applied to preserve and enhance nearby views or maintain unobstructed distant views along the route in rural areas with high scenic qualities. More specifically, scenic corridors are defined as those areas where "Development controls should be applied to preserve and enhance scenic qualities, restrict unsightly use of land, control height of structures, and provide site design and architectural guidance along the entire scenic corridor" (Alameda County 1966). For the areas extending beyond scenic corridors (i.e., beyond 1,000 feet from the right-of-way), the Scenic Route Element also requires basic development controls: in the undeveloped parts of the county, project review should address grading, removal of vegetation, streambeds, landscaping, utility and communication towers, poles and lines, and outdoor advertising signs or structures.

The program area contains one state-designated scenic route, I-580, which is also categorized as one of the County's Scenic Freeways and Expressways. Most of the other roads and highways that traverse the program area are categorized as Scenic Rural-Recreation Routes (or as mapped Major Rural Roads); these are listed below (Alameda County 1966).

- Altamont Pass Road
- Byron-Bethany Road
- Flynn Road
- Grant Line Road
- Mountain House Road
- Patterson Pass Road
- Proposed Route 239 Freeway
- Tesla Road
- Vasco Road

Both Mountain House Road and Altamont Pass Road are located within the Project area. I-580 is adjacent to the southern border of the Project area.

The Scenic Route Element provides the following principles for Scenic Route Corridors that are applicable to the Project. The principles are organized loosely under five headings: the system, the rights-of-way, the corridors, the corridors *and* the remainder or balance of the County, and areas beyond the corridors. For reference in the subsequent discussions, each principle is identified by a code (e.g., SRE-Corr-1).

> **Provide for Normal Uses of Land and Protect Against Unsightly Features:** In both urban and rural areas, normally permitted uses of land should be allowed in scenic corridors, except that panoramic views and vistas should be preserved and enhanced through supplementing normal zoning regulations with special height, area, and sideyard regulations; through providing architectural and site design review; through prohibition and removal of billboards, signs not relevant to the main use of the property, obtrusive signs, automobile wrecking and junk yards, and similar unsightly development or use of land. Design and location of all signs should be regulated to prevent conglomerations of unsightly signs along roadsides. (SRE-Corr-1).
>
> **Locate Transmission Towers and Lines Outside of Scenic Route Corridors When Feasible:** New overhead transmission towers and lines should not be located within scenic corridors when it is feasible to locate them elsewhere. (SRE-Corr-2).
>
> **Underground Utility Distribution Lines When Feasible; Make Overhead Lines Inconspicuous:** New, relocated or existing utility distribution lines should be placed underground whenever feasible. When it is not feasible to place lines underground, they should be located so as to be inconspicuous from the scenic route. Poles of an improved design should be used wherever possible. Combined or adjacent rights-of-way and common poles should be used wherever feasible. (SRE-Corr-3).
>
> **Use Landscaping to Increase Scenic Qualities of Scenic Route Corridors:** Landscaping should be designed and maintained in scenic route corridors to provide added visual interest, to frame scenic views, and to screen unsightly views. (SRE-Corr-5).
>
> **Control Tree Removal:** No mature trees should be removed without permission of the local jurisdiction as a means of preserving the scenic quality of the county. (SRE-Corr/Rem-5).
>
> **Control Alteration of Streambeds and Bodies of Water:** Alteration of streambeds or bodies of water and adjacent vegetation should be permitted only with approval of the local jurisdiction, as a means of preserving the natural scenic quality of the stream courses, bodies of water, vegetation and wildlife in the county. Development along edges of streams, canals, reservoirs, and other bodies of water should be designed and treated so as to result in naturalistic, architectural, or sculptural forms. (SRE-Corr/Rem-6).

Preserve and Enhance Natural Scenic Qualities in Areas Beyond the Scenic Corridor: Views from scenic routes will comprise essentially all of the remainder of the county beyond the limits of the scenic corridor: the corridor is intended to establish a framework for the observation of the views beyond. Therefore, in all areas in the county extending beyond the scenic route corridors, scenic qualities should be preserved through retaining the general character of natural slopes and natural formations, and through preservation and enhancement of water areas, watercourses, vegetation and wildlife habitats. Development of lands adjacent to scenic route corridors should not obstruct views of scenic areas and development should be visually compatible with the natural scenic qualities. (SRE-Beyond Corr-1).

Provide for Normal Uses of Land but Limit Overhead Utilities and Outdoor Advertising Structures: In both developed and undeveloped areas, outdoor advertising structures, utility and communication towers, poles, and wires should be located only where they will not detract from significant scenic views. All other structures and use of land should be permitted as specified in the local zoning ordinance as supplemented by special height regulations. (SRE-Beyond Corr-2)

Lastly, the Scenic Route Element establishes development standards that are applicable to the Project.

Alteration to natural or artificial land contours should not be permitted without a grading permit issued by the local jurisdiction as a means of preserving and enhancing the natural topography and vegetation in developable areas. Mass grading should not be permitted. The following criteria should be applied in the review of grading permits in developable areas:

- As a means of preserving natural *ridge skylines* within the county, no major ridgeline should be altered to the extent that an artificial ridgeline results.
- Access roads should be located and designed to keep grading to a minimum.
- Natural ground contours in slope areas over 10% should not be altered more than 5% overall, except in such slope areas where large stands of mature vegetation, scenic natural formations or natural watercourses exist, where grading should be limited so as to preserve the natural features.
- Any contour altered by grading should be restored by means of land sculpturing in such a manner as to minimize run-off and erosion problems, and should be planted with low maintenance, fire resistant plant materials that are compatible with the existing environment.

Open Space Element

The following principles from the Open Space Element of the General Plan (Open Space Element) are applicable to the Project.

Include Natural Ridgelines and Slope Areas: Natural ridgelines, and slopes in excess of twenty-five percent in grade, should be left as open space to eliminate mass grading.

Consolidate and Locate Utility Lines to Avoid Scenic Areas: Wherever feasible, power and pipe utility lines should be consolidated to prevent further severance of open space lands. Utility lines and aqueducts in open space areas should be located so as to avoid areas of outstanding beauty.

Natural Resources within Open Space Areas Should be Permanently Protected: Within open space areas, either publicly or privately owned, removal of mature trees should not be permitted without the permission of the local authority. Alteration of streambeds or bodies of water and adjacent vegetation should be permitted only as a means of erosion-control or flood control, as permitted by the adopted plans of regional or local jurisdictions, and in such a manner as to enhance water courses, scenic shorelines, and wetlands within the county.

East County Area Plan

The Project falls within the *East County Area Plan* (ECAP). The following goals and policies of the ECAP are applicable to the Project (Alameda County 2000).

Sensitive Viewsheds

Goal: To preserve unique visual resources and protect sensitive viewsheds.

Policy 105: The County shall preserve the following major visually-sensitive ridgelines largely in open space use:

1. The ridgelines of Pleasanton, Main, and Sunol Ridges west of Pleasanton;
2. The ridgelines of Schafer, Shell, Skyline, Oak and Divide Ridges west of Dublin and the ridgelines above Doolan Canyon east of Dublin;
3. The ridgelines above Collier Canyon and Vasco Road and the ridgelines surrounding Brushy Peak north of Livermore;
4. The ridgelines above the vineyards south of Livermore;
5. The ridgelines above Happy Valley south of Pleasanton.

Policy 106: Structures may not be located on ridgelines or hilltops or where they will project above a ridgeline or hilltop as viewed from public roads, trails, parks and other public viewpoints unless there is no other site on the parcel for the structure or on a contiguous parcel in common ownership on or subsequent to the date this ordinance becomes effective. New parcels may not be created that have no building site other than a ridgeline or hilltop, or that would cause a structure to protrude above a ridgeline or hilltop, unless there is no other possible configuration.

Policy 107: The County shall permit no structure (e.g., housing unit, barn, or other building with four walls) that projects above a visually-sensitive major ridgeline**.**

Policy 108: To the extent possible, including by clustering if necessary, structures shall be located on that part of a parcel or on contiguous parcels in common ownership on or subsequent to the date this ordinance becomes effective, where the development is least visible to persons on public roads, trails, parks and other public viewpoints. This policy does not apply to agricultural structures to the extent it is necessary for agricultural purposes that they be located in more visible areas.

Policy 113: The County shall review development proposed adjacent to or near public parklands to ensure that views from parks and trails are maintained.

Policy 114: The County shall require the use of landscaping in both rural and urban areas to enhance the scenic quality of the area and to screen undesirable views. Choice of plants should be based on compatibility with surrounding vegetation, drought-tolerance, and suitability to site conditions; and in rural areas, habitat value and fire retardance.

Policy 115: In all cases appropriate building materials, landscaping and screening shall be required to minimize the visual impact of development. Development shall blend with and be subordinate to the environment and character of the area where located, so as to be as unobtrusive as possible and not detract from the natural, open space or visual qualities of the area. To the maximum extent practicable, all exterior lighting must be located, designed and shielded so as to confine direct rays to the parcel where the lighting is located.

Policy 116: To the maximum extent possible, development shall be located and designed to conform with rather than change natural landforms. The alteration of natural topography, vegetation, and other characteristics by grading, excavating, filling or other development activity shall be minimized. To the extent feasible, access roads shall be consolidated and located where they are least visible from public view points.

Policy 117: The County shall require that where grading is necessary, the off-site visibility of cut and fill slopes and drainage improvements is minimized. Graded slopes shall be designed to simulate natural contours and support vegetation to blend with surrounding undisturbed slopes.

Policy 118: The County shall require that grading avoid areas containing large stands of mature, healthy vegetation, scenic natural formations, or natural watercourses.

Policy 119: The County shall require that access roads be sited and designed to minimize grading.

Policy 120: The County shall require that utility lines be placed underground whenever feasible. When located above ground, utility lines and supporting structures shall be sited to minimize their visual impact.

Windfarms

Goal: To maximize the production of wind generated energy.

Policy 169: The County shall allow for continued operation, new development, redevelopment, and expansion of existing and planned windfarm facilities within the limits of environmental constraints.

Policy 170: The County shall protect nearby existing uses from potential traffic, noise, dust, visual, and other impacts generated by the construction and operation of windfarm facilities.

Streets and Highways

Goal: To complete County-planned street and highway improvements which are attractively designed to integrate pedestrian and vehicle use.

Policy 198: The County shall allow reductions in roadways widths in areas of complex topography, sensitive resources, or scenic value.

Scenic Highways

Goal: To preserve and enhance views within scenic corridors.

Policy 215: The County shall manage development and conservation of land within East County scenic highway corridors to maintain and enhance scenic values.

Environmental Setting

Regional Character

The APWRA is in an unincorporated rural part of Alameda County, in the northeastern corner of the county near the western boundary of San Joaquin County and the southern boundary of Contra Costa County.

The area's topography is characterized by grass-covered, rounded hills and smooth contours, much of which serves as cattle grazing land. A broad, flat expanse of the San Joaquin Valley lies to the northeast and east, as well as the community of Mountain House and the City of Tracy. The Delta lies northeast of the region. The hills are generally steeper and higher to the west and south within the APWRA, with milder slopes and lower elevations towards the northeast. The APWRA's principal visual character was historically established in the 1980s by the development of hundreds of small turbines across its ridges and hilltops, as shown in two loosely representative photographs from the PEIR included in this document as Figure 3.1-1. Other prominent features are road and railroad cuts, scattered rural residential homesites, farm complexes, a few industrial operations, and a number of long-distance electrical transmission corridors. The Altamont Landfill occupies a large area within the APWRA, about two miles west of the Project site area, but is generally out of sight from public view due to its placement away from and above Altamont Pass Road.

The rolling terrain and prominence of hundreds of old generation turbines that lined most of the horizons resulted in a unique visual experience for viewers on designated scenic routes, as shown in Figure 3.1-2, and from other roadways. The PEIR described the old generation turbines as having some visual appeal, but also as negative features that densely populated the hillsides, hilltops and ridges, and compromise the visual integrity of the landscape. The PEIR also acknowledged some areas in the APWRA that are not presently developed with wind turbines or other industrial uses, to the south of I-580, where trees are more prominent and that has more rugged, steeper slopes.

Project and Vicinity Character

The Project vicinity is defined as the area within 0.5 mile of the Project area, which is shown in Figure 3.1-2 within the overall APWRA area along with its adjacent scenic routes, trails, and major regional features. As shown, Bethany Reservoir State Recreation Area forms the western part of the northern boundary, which continues easterly and generally along or parallel to Kelso Road. The Delta-Mendota Canal forms an eastern boundary, and the San Joaquin County line is approximately 0.5 miles further east. The southern limits of the Project vicinity roughly follow Grant Line Road, Altamont Pass Road and I-580 while the western side features no public roadways but instead only other ranchlands within the APWRA leased for wind energy development, containing the Golden Hills North and Diablo Winds projects. The Project area is chiefly divided almost diagonally by Bethany Reservoir as it extends southeasterly through its northwestern quarter, and the California Aqueduct and associated Bikeway that continue from the Reservoir to the southeast and beyond the Project vicinity. Roughly a third of the Project area is to the northeast of the Reservoir and Aqueduct, and the remainder to the southwest. The two main portions have somewhat distinct characteristics; however, after a description of the area's general visual features, the following discussion is divided between views from around the northeast portion including toward the southwest portion, and then views of the southwest portion from the roads and highways along the south side of the whole area.

Similar to the greater region of the APWRA, the Project area and vicinity is mostly characterized by grass-covered, rolling hills, with road cuts to accommodate its rural roads and I-580. As indicated above, the northeast portion of the APWRA, which encompasses the Project vicinity, is distinguished by lower elevations and milder slopes. As with other areas of the APWRA, there is a mixture of visual appeal and intervening artificial structures that detract from the overall cohesion and attractiveness of the area. The most visually distinct existing artificial features throughout the area are three parallel high-tension transmission line corridors with tall pylon towers traversing the area from north to south, roughly parallel to the Reservoir and Aqueduct (two corridors on the west side and one to the east). Until recently (after 2016), strings of turbines across most of surrounding ridgelines were also very prominent and an established part of the viewshed in most view directions from area roads and along the Reservoir and Aqueduct Bikeway. Other features include scattered rural residences and ranching and support complexes, together with other power lines, transformers, access roads, and substations. The quality of these views also vary, seasonally, when the grasses on the hillsides change from green to brown.

Along Christensen and Mountain House Roads in its northeastern area, and east of the California Aqueduct Bikeway, the ridges rise about 100 feet. In this area, a single large ridge east of Mountain House Road north of Grant Line Road and the Mountain House Bar had been in active wind energy production use with over a hundred old generation turbines until they were removed starting in

1. From east bank of Bethany Reservoir looking northwest.

2. From westbound I-580 looking southwest.

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Figure 3.1-1
Turbine Presence in the Project Area

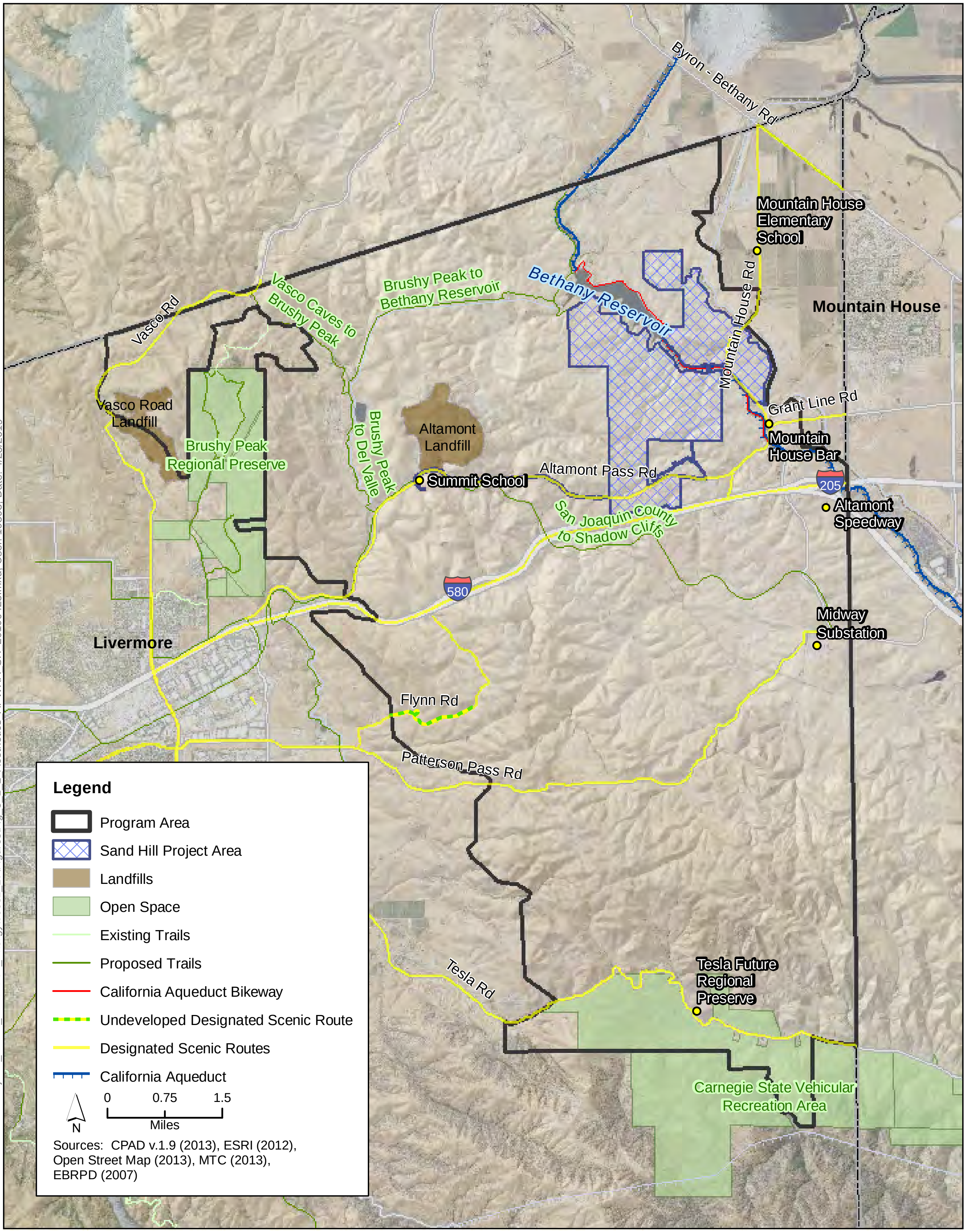

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Figure 3.1-2
Visual Resources in the Program Area

2016. On the north and west side of Mountain House Road in the same area and extending to the California Aqueduct and about one mile beyond the Aqueduct, there were several hundred old generation wind turbines operating from the mid-1980s to the mid-90s, but there have been no active wind turbines in this area since before 1998. The area due west of the Reservoir, however, had active wind turbines until 2017, and the area further west of the Project site, which forms the more distant horizon view, has about 30 operating third-generation turbines as part of the Diablo Winds project. The area northeast of Bethany Reservoir also had been developed with dense rows of turbines, but these had also been discontinued from energy production since before 1998. Two large water and power facilities are located near Kelso Road that also are major sources of nighttime lighting in the vicinity. As a result, the existing baseline views to the west from Mountain House Road, east and south from Bethany Reservoir, and north and south from the Bikeway are of mostly undeveloped ridges, whereas in other individual views from the Mountain House Road scenic route and westward from Bethany Reservoir, the baseline view is of dense wind turbine walls that existed in the Project vicinity until their recent removal. Figures 3.1-4 through 3.1-9 include views of existing conditions in this vicinity. However, the large transmission tower pylons, and local utility lines and poles are also visible and prominent in nearly all existing views in the Figures.

To the southwest, where the Project site borders Altamont Pass Road and I-580, and in the overall area west and south of the Reservoir and the Aqueduct, the hills are more rolling and rise up to 200 feet above the roadway or the small valleys and drainages across the area. Dense lines of turbines were prominent on both sides of Altamont Pass Road in the Project vicinity and also visible from I-580 until their recent removal. Numerous new generation turbines west of the Project site (in the Golden Hills North Wind project site area) are also very prominent in the background from near the Project site where it borders these designated scenic routes.

In general, most foreground and middle-ground views from scenic routes and recreational facilities against which the Project is evaluated in this SEIR is of dense rows of turbines across ridgelines that characterized most of the area since the 1980s, but some individual views do not include turbines as existing conditions or at the time of the Notice of Preparation for the PEIR in 2010.

Existing Viewer Groups and Viewer Responses

The following discussion of existing viewer groups and viewer responses is applicable to the Project.

Residents

A few rural residences are scattered throughout the Project area, particularly off Altamont Pass Road and Mountain House Road. These residences tend to be mostly single-family, rural homes on large land parcels. The views of most residents in the program area consist of smooth, grass-covered, rolling hills, transmission lines and towers and turbine strings that have characterized much of the program area for over three decades. Residents would be expected to have the highest sensitivity to visual changes in the Project areas because of their familiarity with the view, their investment in the area, and their sense of ownership of the view. Residents who occupy parcels leased for wind generation facilities would be expected to have the lowest level of sensitivity to change because these landowners have agreed to lease the site for wind energy generation purposes and would therefore be more accepting of related visual changes.

Roadway Users

Motorists may use roadways in the Project vicinity for commuting and hauling or for more recreational uses, such as sightseeing on scenic roadways. Roadways traversing the Project vicinity range from high-speed interstate to lower-speed, two-lane local roadways that wind through the rolling landscape. Motorists' views range from smooth, grass-covered, rolling hills dominated with turbine strings to steep ridges and ravines with no artificial structures. Although more numerous than residents, motorists would generally be less sensitive to visual changes in the Project area because of the shorter duration of their exposure to the views and the focus of their attention on driving activities. Therefore, motorists are considered to have moderate visual sensitivity.

Recreationists

Recreationists include cyclists and pedestrians on trails and local roadways and users of recreational and preserve areas. Viewers using recreation trails, recreation areas, and regional preserves are considered to have high visual sensitivity because recreationists tend to highly value views in designated recreation areas and could be exposed to these views for extended periods (e.g., hiking or biking along regional trails or spending the day at Bethany Reservoir).

3.1.3 Environmental Impacts

This section describes the aesthetics impact analysis for the Project. The section describes the methods used to determine the impacts of the Project, lists the thresholds used to conclude whether an impact would be significant, and identifies impacts that would result from Project implementation. The section also specifies measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts.

Methods for Analysis

The Project-level analysis was based on review of the PEIR and on the visual photo simulations listed above. These photo simulations are presented in Figures 3.1-3 through 3.1-10.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the proposed Project would be considered to have a significant effect if it would result in any of the conditions listed below.

- A substantial adverse effect on a scenic vista.
- Substantial damage to scenic resources, including but not limited to trees, rock outcroppings, and historic buildings along a scenic highway.
- In non-urbanized areas, substantial degradation of the existing visual character or quality of public views of the site and its surroundings. In urbanized areas, conflict with applicable zoning or other regulations governing scenic quality.
- Introduction of a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area.

It may be noted by the reader that the third condition is notably different from the comparable criterion used in the PEIR, and that clearly only the first sentence or portion applies to the current Project. The difference is due to revisions to the CEQA Guidelines adopted by the state in 2018.

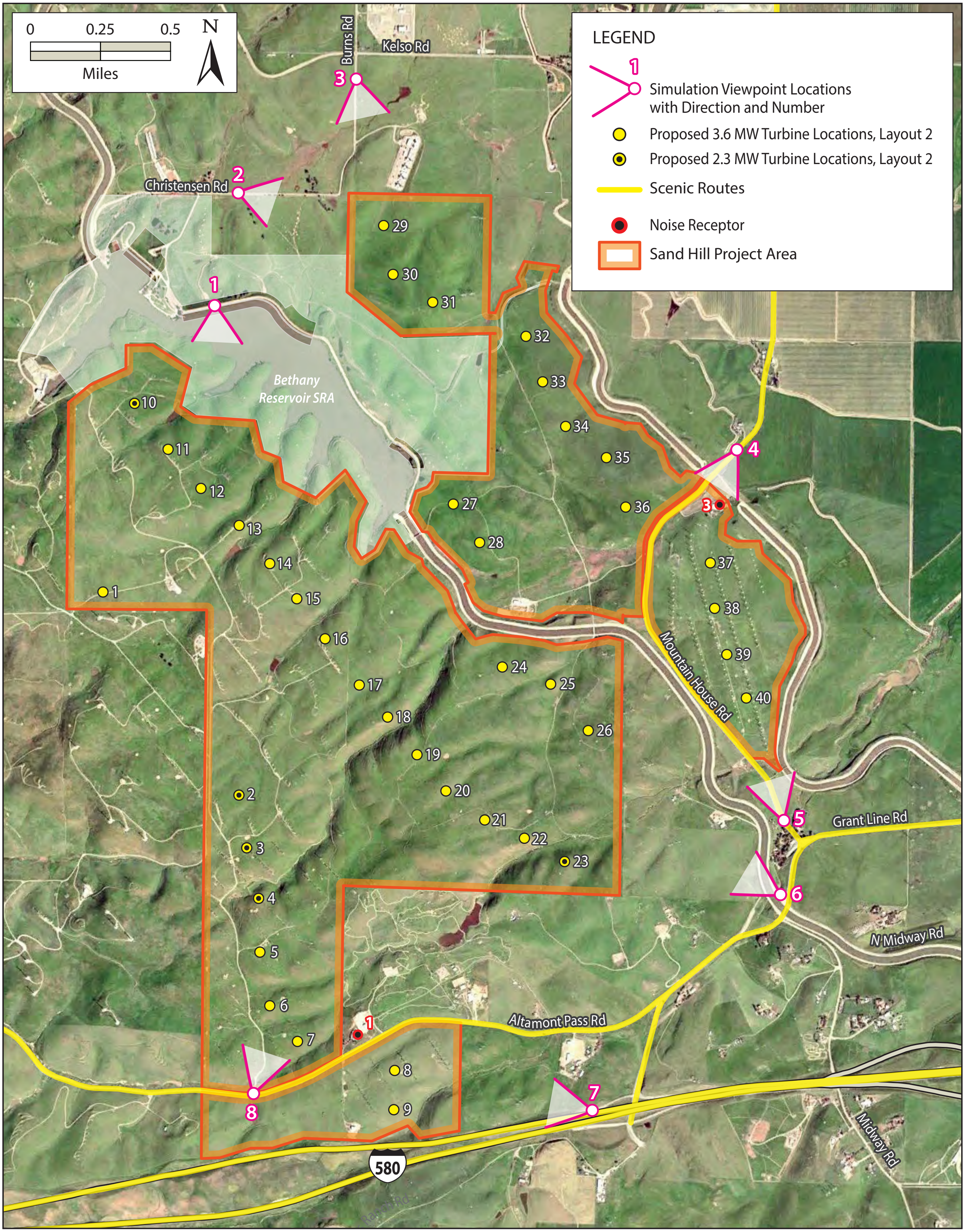

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Figure 3.1-3
Visual Simulation Viewpoint Locations

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Figure 3.1-4
Viewpoint 1—Looking Southwest from California Aqueduct Bikeway at Bethany Reservoir

Figure 3.1-5
Viewpoint 2—Looking East along Christensen Road near Bethany Reservoir Entrance Road

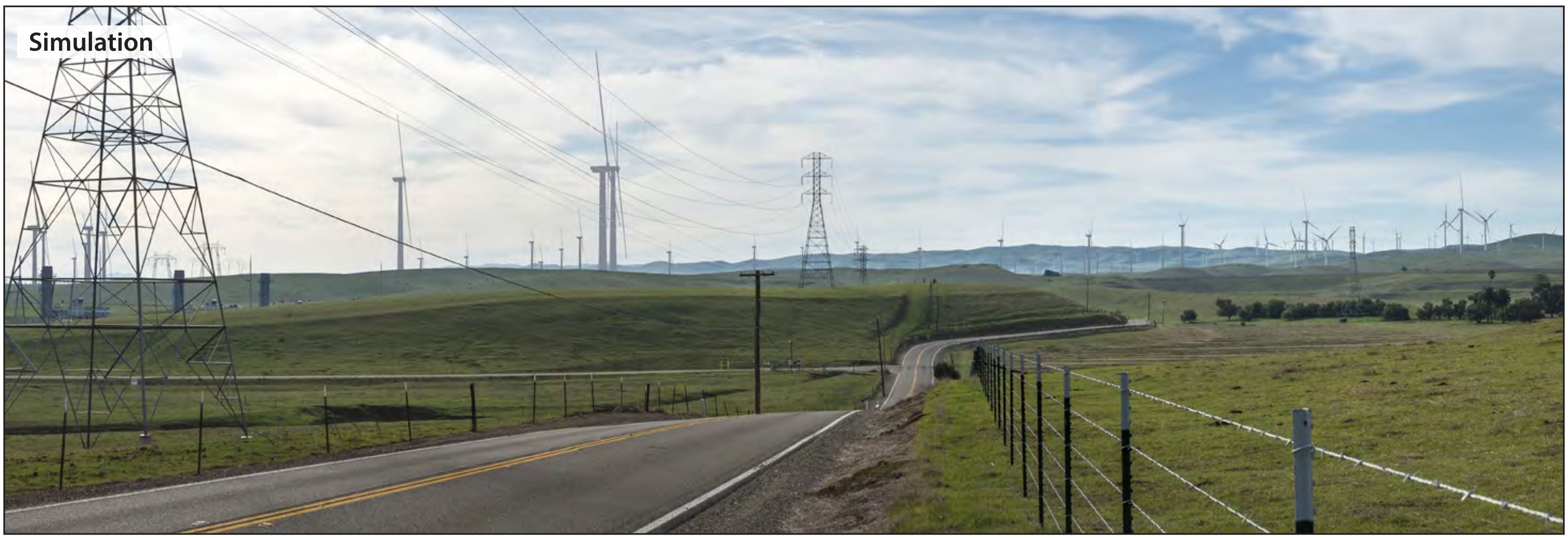

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Figure 3.1-6
Viewpoint 3—Looking South along Bruns Road from 0.15 mile South of Kelso Road

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Figure 3.1-7
Viewpoint 4—Looking Southwest along Mountain House Road from 1.4 miles South of Kelso Road

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Figure 3.1-8
Viewpoint 5—Looking North by Northwest along Mountain House Road from North of West Grant Line Road Intersection

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Figure 3.1-9
Viewpoint 6—Looking West by Northwest from California Aqueduct Bikeway at Grant Line Road Crossing

ICF Graphics ... 00631.17 (5-1-2018) tm

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Figure 3.1-10
Viewpoint 7—Looking West by Northwest from Westbound I-580 at the West Grant Line Road Onramp

Impacts and Mitigation Measures

Project Impacts

Impact AES-1: Potential to have a substantial adverse effect on a scenic vista (less than significant with mitigation)

Temporary Visual Impacts Caused by Construction Activities

The PEIR concluded that construction activities associated with the repowering program could result in a significant impact, particularly for highly sensitive viewers such as residents and recreationists. The analysis specifically called out Bethany Reservoir, which is surrounded by the Project area, as well as scenic roadways and recreation trails such as the California Aqueduct Bikeway.

Construction of the proposed Project is expected to last approximately 8 months. In general, views of construction activities and equipment, though temporary, could be adverse and disturbing to residents and the users of the recreational facilities in the Project area, and high-powered construction nighttime lighting could be perceived as significant and adverse by area residents. Additional discussion of the visual impacts of construction activities are in the discussion of the program alternatives in the PEIR (Impacts AES-1a-1 and AES-1a-2), here incorporated by reference. Temporary construction impacts of the proposed Project would be similar to those described in the PEIR for the program alternatives and to the two projects that were evaluated at a project level in the PEIR. Thus, the highly sensitive viewers in the Project area (residents and recreationists) could be adversely affected by construction activities. This impact would be potentially significant. Implementation of PEIR Mitigation Measure AES-1 would reduce this impact to a less-than-significant level.

Long-Term Impacts

There are no formally designated scenic vistas in the Project area or vicinity. However, the PEIR analysis of the repowering program and the two projects evaluated at the project level (the Golden Hills and Patterson Pass projects) addressed scenic vistas available from local roadways and recreational trails. The analysis of the program indicated that new turbine structures located on ridges in the program area that were specifically identified for protection in the ECAP by Policy 105 would constitute a significant adverse visual impact, especially if they were located in areas that had not previously been developed with wind turbines or where they did not exist at the time the PEIR was being prepared (formally when the PEIR Notice of Preparation was circulated in 2010). Although these sensitive ridgelines and hilltops as referenced in Policy 105 are outside of the Project area, as shown on Figure 3.1-2 (e.g., Brushy Peak and ridgelines along Patterson Pass and Vasco Roads), a number of scenic vistas are available from local roadways, out and over the Project area, which are protected by ECAP Policies 170 and 215, as discussed in the PEIR analysis of the program alternatives. Policies 106, 113, 114, 115, 169, and 170, also described above and in the PEIR, provide additional guidance on the assessment of aesthetic impacts. Policy 106 disallows structures in general if they project above ridgelines and hilltops when viewed from public roads, trails, parks or public view points unless there is no other location on the site for a permitted structure. In the case of the wind turbines, of course, there is no feasible location where they would not project above the ridgelines where they would be placed. Policy 113 also directs the County to ensure that views from parks and trails are maintained when reviewing development proposals on adjacent lands.

The analysis of program impacts on scenic vistas in the PEIR concluded that where no turbines currently exist the impact would be significant, but that in areas with existing older turbines the replacement of the many existing smaller and older turbines with proportionally far fewer and less intrusive fourth-generation turbines would be less than significant because it would serve ECAP Policies 170 and 215, and otherwise serve to protect and enhance scenic values. The PEIR discusses scenic routes identified in the County's Scenic Route Element of its General Plan, including for example, Byron-Bethany Highway, Mountain House Road, Tesla Road and Vasco Road, and views from recreational areas and trails as sensitive to new development of wind turbines. The PEIR analysis focused on the potentially significant adverse impacts of new turbines on ridgelines and hilltops where no turbines are present, and also discussed views from recreational areas and trails that may be potentially and adversely impacted by the construction of new turbines.

More specifically for the subject Project, and comparable to the project-level analysis provided in the PEIR of the Golden Hills project, it is recognized that within the Sand Hill Wind Project vicinity the majority of views, as shown in the existing conditions views in Figures 3.1-4 through 3.1-9 (most of which show conditions prior to the recent turbine removal after 2016), are of dense turbine walls. For views towards the old generation turbines, the impact would be less than significant. As stated in the PEIR, and evident in Figures 3.1-4 to 3.1-11, the new widely spaced configuration and greatly reduced concentration or density of turbines detracts much less from the natural landscape than the previously existing string configuration. Consistent with the PEIR analysis, the new, less-cluttered configuration of turbines allows for views of the rolling, grassy terrain to become more prominent, back-dropped against the sky, and less interrupted by anthropogenic features. While the larger turbines would draw viewers' attention toward them, the eye is also able to follow the ridgeline of the hills in a more cohesive manner than when the previously existing turbines were in place. These include views from local roads including scenic routes, Bethany Reservoir State Recreational Area, and the California Aqueduct Bikeway, of wide open panoramic views of rolling, grass-covered, rural landscapes that for most of the past 30 years were dominated by the pre-existing old generation turbines.

The hub height of first- and second-generation turbines ranges from 18 to 55 meters (approximately 59 to 180 feet) and third-generation range from 41 to 68 meters (approximately 134 to 223 feet). The proposed fourth-generation Project hub heights would be from 80 to 85 meters (262 to 279 feet) and thus between 30 and 67 meters (98 to 220 feet) taller than the largest first- and second-generation turbines previously located in the program area and on the Project sites. In addition, the rotor blade lengths of fourth-generation turbines, as described in the PEIR, are considerably longer (about 41 to 62 meters, or 135 to 205 feet) than those used in the first- and second-generation turbines (about 7.5 to 9 meters, or 25 to 30 feet), an increase of roughly four-and-half to eight times longer. Although the hub heights for the Project are typical of fourth-generation land-based turbines, the rotor lengths could be moderately longer than those evaluated in the PEIR, up to 67.2 meters (220 feet), or 4.7 meters (15 feet) for the 3.6 MW turbine model under consideration, which represents a roughly 7 percent increase. However, it is not expected that the moderate increase in rotor length over those turbines that are now in place could be distinguished by most people and therefore the total turbine height and blade length would not by itself be considered to result in more severe visual impacts compared to the turbines that were under consideration in the PEIR.

Views of the proposed turbines may be more or less prevalent depending on a viewer's location within the landscape and if the viewer has more direct views of the turbines or views that are partially or fully screened by topography. Some of the turbines are proposed to be as close as 600 feet from viewers, such as for turbine site 36 northwest of Mountain House Road; sites 27 and 28

Figure 3.1-11
Viewpoint 8—Looking Northeast from Altamont Pass Road at Unnamed Access Road

east of the Bikeway would be less than 700 feet distant from the trail. Turbine sites 24 and 25 would be about 800 and 1,000 feet, respectively, south of the Bikeway, and about a quarter mile west of Mountain House Road. Turbine site 35 would be roughly 1,600 feet northwest of Mountain House Road (another 1,000 feet beyond site number 36). Turbine site 30 would be an estimated 1,800 feet northeast of Bethany Reservoir at its closest, though the turbine sites closest to that site, numbers 29 and 31, would be further, about 2,500 and 2,200 feet away from the Reservoir, respectively. These seven turbines, at less than 2,000 feet from scenic routes, recreation areas and trails, and within views that did not have turbines in place since 1998 or at the time the PEIR began preparation in 2010, would therefore have potentially significant impacts on a scenic vista. Turbines further than 2,000 feet distant are considered to be in the middle-ground range where they would be noticeable but less adverse seeming. A general threshold of 2,000 feet was also used in the PEIR for mitigation measure AES-2a and for turbine-specific site development review.

Policy 215 of the ECAP requires the County to maintain and enhance scenic values in scenic route areas through review of development and use of conservation policies. Therefore, with respect to ECAP Policies 170 and 215, the replacement of the many previously existing smaller and older turbines with proportionally far fewer fourth-generation turbines with broader spacing would serve these policies and help to protect and enhance scenic values. For areas where no turbines currently exist, the conflict with Policies 170 and 215 and the visual impact itself would be significant. In the Project area, such conditions exist only on certain parcels east and south of Bethany Reservoir.

Implementation of 2019 Updated PEIR Mitigation Measure AES-2a, and PEIR Mitigation Measure AES-1, AES-2b, and AES-2c would reduce this impact to a less-than-significant level.

PEIR Mitigation Measure AES-1: Limit construction to daylight hours

Major construction activities will not be undertaken between sunset and sunrise or on weekends. Construction activity is specifically prohibited from using high-wattage lighting sources to illuminate work sites after sunset and before sunrise, with the exception of nighttime deliveries under the approved transportation control plan or other construction activities that require nighttime work for safety considerations.

2019 Updated PEIR Mitigation Measure AES-2a: Require site development review

New turbines along ridgelines or hilltops that have not previously been developed with commercial-scale wind turbines or where wind turbines were not part of the visual baseline as of 2010 will not be allowed, unless a separate Site Development Review is completed that determines that the visual effects will be substantially avoided by distance from public view points (e.g., more than 2,000 feet), intervening terrain, screening landscaping, or compensatory improvements to equivalent and nearby (radius of 1 mile) scenic features, as approved by the Planning Director.

PEIR Mitigation Measure AES-2b: Maintain site free of debris and restore abandoned roadways

Project sites will be cleaned of all derelict equipment, wind turbine components not required for the project, and litter and debris from old turbines and past turbine operations. Such litter and debris may include derelict turbines, obsolete anemometers, unused electrical poles, and broken turbine blades. In addition, abandoned roads that are no longer in use on such parcels will be restored and hydroseeded to reclaim the sites and remove their visual traces from the viewscape, except in cases where the resource agencies (USFWS and CDFW) recommend that the features be left in place for resource protection. All parcels with new turbines will be maintained in such a manner through the life of project operations and until the parcels are reclaimed in accordance with the approved reclamation plan.

PEIR Mitigation Measure AES-2c: Screen surplus parts and materials

Surplus parts and materials that are kept onsite will be maintained in a neat and orderly fashion and screened from view. This can be accomplished by using a weatherproof camouflage material that can be draped over surplus parts and materials stockpiles. Draping materials will be changed out to accommodate for seasonal variations so that surplus materials are camouflaged in an effective manner when grasses are both green and brown.

Impact AES-2: Potential to substantially damage scenic resources along a scenic highway (less than significant with mitigation)

County-designated scenic roads and highways in the Project area are shown on Figure 3.1-2 and include Grant Line Road, Mountain House Road, Altamont Pass Road, as well as I-580. Because these routes were lined with previously existing turbines until those turbines were recently removed, motorists on these routes are accustomed to views of turbines. Although the new, more efficient turbines would be substantially taller than the previously existing turbines, the new widely spaced configuration would detract less from the natural landscape than did the previously existing configuration (Figures 3.1-4 to 3.1-11). The proposed configuration would allow for views of the rolling, grassy terrain to become more prominent, back-dropped against the sky, and less interrupted by anthropogenic features. Although the larger turbines would draw viewers' attention toward them, the eye would be able to follow the ridgeline of the hills in a more cohesive manner.

For areas where no turbines currently exist, on certain parcels east and south of Bethany Reservoir, the effect on the scenic resources and the visual impact itself would be significant. The Project is identified as having potentially significant impacts due to the placement of 17 of its 40 new turbines (about two-fifths) in areas that have not had turbines in place for over 20 years. More specifically, as described above, two turbine sites, numbers 35 and 36 would be less than 2,000 feet northwest of Mountain House Road, on a ridgeline that did not have turbines in place since 1998. These two turbines would therefore have potentially significant impacts on scenic resources along a local scenic highway. For those areas that were occupied with older turbines, the replacement of the many previously existing smaller and older turbines with proportionally far fewer and less intrusive fourth-generation turbines would serve Policies 170 and 215 of the ECAP, and serve to protect and enhance scenic values. Where the new turbines would replace old generation turbines such as on the east side of Mountain House Road and along Altamont Pass Road, therefore, the impact would be less than significant.

The PEIR discusses scenic routes identified in the County's Scenic Route Element of its General Plan, including for example, Byron-Bethany Road, Mountain House Road, Tesla Road and Vasco Road, and views from recreation areas and trails as sensitive to new development of wind turbines. Although the emphasis of the PEIR discussion was on the potentially significant adverse impacts of new turbines on ridgelines and hilltops, it is evident that views towards such ridgelines and hilltops from scenic routes where no turbines are present, or views generally from recreation areas and trails, may be potentially and adversely impacted by the construction of new turbines.

The PEIR also cites ECAP Policy 170, which states: "The County shall protect nearby existing uses from potential traffic, noise, dust, *visual*, and other impacts generated by the construction and operation of windfarm facilities" (emphasis added), and further stated that in relation to Policy 170, because areas bordering Tesla Road, as a specific example, "is an area where no turbines currently exist, the conflict with Policies 170 and 215 and the visual impact itself [of constructing new wind turbines] would be significant" (ibid.). The County considers the Tesla Road reference in the PEIR to have been a prime example, but that is not meant to be exclusive of other areas bordering scenic routes, recreation areas or trails, such as the Bethany Reservoir or the California Aqueduct Bikeway that border areas where turbines have been absent since before 1998, or in place as of 2010. Implementation of 2019 Updated PEIR Mitigation Measure AES-2a, and PEIR Mitigation Measure AES-2b, and AES-2c would reduce this impact to a less-than-significant level.

2019 Updated PEIR Mitigation Measure AES-2a: Require site development review

PEIR Mitigation Measure AES-2b: Maintain site free of debris and restore abandoned roadways

PEIR Mitigation Measure AES-2c: Screen surplus parts and materials

Impact AES-3: In non-urbanized areas, degradation of the existing visual character or quality of public views of the site and its surroundings; in urbanized areas, conflict with zoning or other regulations governing scenic quality (less than significant with mitigation)

As described above, I-580, Mountain House Road, and Altamont Pass Road are considered scenic routes. As stated in the PEIR, there are portions of these roads where no turbines currently exist, but, because motorists are accustomed to seeing wind turbines along these routes, motorists would not be adversely affected. However, recreationists using Bethany Reservoir and the associated California Aqueduct Bikeway would be highly sensitive to changes in the visual character that the addition of new turbines would result in, especially where no turbines were part of the 2010 viewshed baseline. In particular and as discussed above, turbine sites 24 and 25 south of the Bikeway, sites 27 and 28 east of the Bikeway, and site 30 northeast of the Reservoir would be within 2,000 feet of public views where no turbines have been in place for over 20 years. These five turbines therefore would have potentially significant impacts on visual character in a non-urbanized area. Although the Project would add 17 of its 40 new turbines (about two-fifths) in areas that have not had turbines in place for this length of time, the majority of these would be sufficiently distant from public views, or in areas where the existing viewshed contained many old turbines. These include turbine sites 17 through 23 and 26 south of the Bikeway, and sites 29 and 31 through 34 north and east of the Reservoir. These turbines are assessed as having a less than significant impact on visual character or quality in public views in this non-urbanized area of Alameda County.

The County would be obligated to comply with measures set forth to protect visual resources along scenic roadways and open space areas identified for protection, as detailed in the Scenic Route and Open Space Elements of the *Alameda County General Plan* (Alameda County 1966). In addition, the County is obligated to comply with measures set forth in the ECAP to protect visual resources, such as sensitive viewsheds, streets and highways, scenic highways, and areas affected by windfarms (Alameda County 2000). The proposed Project is similarly subject to these requirements. Implementation of 2019 Updated PEIR Mitigation Measure AES-2a, and PEIR Mitigation Measure AES-2b, and AES-2c would reduce this impact to a less-than-significant level.

2019 Updated PEIR Mitigation Measure AES-2a: Require site development review

PEIR Mitigation Measure AES-2b: Maintain site free of debris and restore abandoned roadways

PEIR Mitigation Measure AES-2c: Screen surplus parts and materials

Impact AES-4: Introduction of a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area (less than significant with mitigation)

Light and Glare

The PEIR concluded that lighting required by the FAA in the Project area and vicinity and lighting associated with the substations would be shielded and directed downward to reduce glare, and that the color of new towers and rotors would be neutral and non-reflective.

Since the preparation of the PEIR, the County has noted that lighting associated with the turbines may have effects beyond those described in the PEIR, as presented in Chapter 2, Section 2.1.4, *Proposed Project Characteristics*. First- and second-generation turbines were all under 200 feet in height, and, for this reason, almost no FAA lighting was required. With the addition of FAA-required lighting for the fourth-generation turbines (the repowered Golden Hills and Golden Hills North projects) which were taller, nighttime lighting was not similar in character to the existing facilities, but instead highly noticeable. It is understood that the FAA may have some discretion to not require every turbine to provide nighttime lighting for aesthetic reasons and because the lighting is acknowledged to be an attractant to some birds. As stated in Section 3.0, the County has noted that although the PEIR stated that nighttime lighting for repowered turbines would be similar to the lighting of previously existing turbines due to the very substantial reduction in the number of turbines, in fact the new turbines would have lighting mandated by the Federal Aviation Administration (FAA) that differs observably from the lighting used on previously existing turbines due to the physical characteristics – primarily height – of the newer turbines. Because the County does not have the ability to limit the placement of required FAA lighting, and the PEIR established that such lighting at a program level would have a less-than-significant impact, and that conclusion is not subject to change because information about FAA lighting could have been known with reasonable diligence prior to certification of the PEIR, the impacts of FAA lighting requirements at a program level have already been considered and are not further analyzed in this SEIR. The specific lighting characteristics of the Project are considered in this section.

Shadow Flicker

The PEIR also concluded that shadow flicker—caused by blade rotation—could create a disruptive visual intrusion to residents who are exposed to the condition for extended periods: more than 30 minutes in a given day or 30 hours in a given year. In accordance with PEIR Mitigation Measure AES-5, *Analyze shadow flicker distance and mitigate effects or incorporate changes into project design to address shadow flicker*, Sand Hill would retain a qualified engineering firm to conduct a shadow flicker analysis. The terms of the mitigation measure require that Sand Hill implement measures to minimize the effect in consultation with the owner of the affected residence. Implementation of PEIR Mitigation Measure AES-5 would reduce this impact to a less-than-significant level.

2019 Updated PEIR Mitigation Measure AES-2a: Require site development review

PEIR Mitigation Measure AES-5: Analyze shadow flicker distance and mitigate effects or incorporate changes into Project design to address shadow flicker

Where shadow flicker could result from the installation of wind turbines proposed near residences (i.e., within 500 meters [1,640 feet] in a generally east or west direction to account for seasonal variations), the project applicant will prepare a graphic model and study to evaluate shadow flicker impacts on nearby residences. No shadow flicker in excess of 30 minutes in a given day or 30 hours in a given year will be permitted. If it is determined that existing setback requirements as established by the County are not sufficient to prevent shadow flicker impacts on residences, Alameda County will require an increase in the required setback distances to ensure that residences are not affected. If any residence is affected by shadow flicker within the 30-minute/30-hour thresholds, the applicant will implement measures to minimize the effect, such as relocating the turbine, providing opaque window coverings, window awnings, landscape buffers, or a combination of these features to reduce flicker to acceptable limits for the affected receptor; or shutting down the turbine during the period shadow flicker would occur. Such measures may be undertaken in consultation with the owner of the affected residence. If the shadow flicker study indicates that any given turbine would result in shadow flicker exceeding the 30-minute/30-hour thresholds and the property owner is not amenable to window coverings, window awnings, or landscaping and the turbine cannot be shut down during the period of shadow flicker, then the turbine will be relocated to reduce the effect to acceptable limits.

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3.2 Agricultural and Forestry Resources

This section describes the regulatory and environmental setting for agricultural and forestry resources in the Project area. It also describes impacts on these resources that could result from implementation of the Project.

3.2.1 Existing Conditions

Regulatory Setting

Federal

There are no relevant federal regulations for agricultural and forestry resources.

State

Farmland Mapping and Monitoring Program

The California Department of Conservation's Farmland Mapping and Monitoring Program (FMMP), administered by the Division of Land Resource Conservation, is responsible for mapping and monitoring Important Farmlands for most of the state's agricultural areas. The FMMP updates its farmland maps every two years based on information from local agencies. FMMP maps show five categories of agricultural lands and three categories of nonagricultural lands, described in the following sections.

Agricultural Lands

Following are descriptions of the farmland mapping categories used by the FMMP. The minimum mapping unit for all agricultural land categories is 10 acres, except for Grazing Land where the minimum mapping unit is 40 acres.

Prime Farmland, Farmland of Statewide Importance, and Unique Farmland are the most suitable for agriculture and are considered especially important agricultural resources. They are often referred to collectively as *important farmland*. Grazing Land may also qualify as important farmland where grazing is a key component of the local economy.

- Prime Farmland is defined by the state as farmland with the best combination of physical and chemical features able to sustain long-term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Prime Farmland must have been used for irrigated agricultural production at some time during the 4 years prior to the mapping date.
- Farmland of Statewide Importance is defined as "irrigated land similar to Prime Farmland that has a good combination of physical and chemical characteristics for the production of agricultural crops." However, this land has minor shortcomings, such as steeper slopes or less ability to store soil moisture than Prime Farmland. For land to be designated as Farmland of Statewide Importance, it must have been used for production of irrigated crops at some time during the 4 years prior to the mapping date.

- Unique Farmland is considered to consist of lower-quality soils but nonetheless is used for production of the state's leading agricultural crops. Unique Farmland is usually irrigated, but may include nonirrigated orchards or vineyards in some climatic zones. To qualify for this designation, land must have been used for crops at some time during the 4 years prior to the mapping date.
- Farmland of Local Importance is land identified as important to the local agricultural economy by each county's board of supervisors and a local advisory committee.
- Grazing Land is land on which the existing vegetation is suited to the grazing of livestock. This category was developed in cooperation with the California Cattlemen's Association, the University of California Cooperative Extension, and other groups interested in the extent of grazing activities.

Nonagricultural Lands

Following are descriptions of the nonagricultural land mapping categories used by the FMMP. Mapping units for nonagricultural lands vary, as described below.

- Urban and Built-Up Lands consist of land occupied by structures with a building density of at least 1 structure to 1.5 acres, or approximately 6 structures to a 10-acre parcel. This type of land is used for residential, industrial, commercial, construction, institutional, and public administration purposes; railroad and other transportation yards; cemeteries; airports; golf courses; sanitary landfills; sewage treatment facilities; water control structures; and other developed purposes.
- Other Land is land not included in any other mapping category. Examples include low-density rural developments and brush, timber, wetland, and riparian areas not suitable for livestock grazing. This category also includes vacant and nonagricultural land surrounded on all sides by urban development; confined livestock, poultry, or aquaculture facilities; strip mines; borrow pits; and water bodies smaller than 40 acres.
- Water includes perennial water bodies with an extent of at least 40 acres.

California Land Conservation Act (Williamson Act)

The Williamson Act is one of the state's primary mechanisms for conserving farmland. It enables counties and cities to designate agricultural preserves (Williamson Act lands) and to offer preferential taxation to private agricultural landowners based on the income-producing value of their property in agricultural use, rather than on the property's assessed market value. In return for the preferential tax rate, the landowner is required to sign a contract with the county or city agreeing not to develop the land for a minimum 10-year period. Contracts are automatically renewed annually unless a party to the contract files for nonrenewal or petitions for cancellation. If the landowner chooses not to renew the contract, it expires at the end of its duration. Under certain circumstances, a county or city may approve a request for cancellation of a Williamson Act contract. Cancellation requires private landowners to pay back taxes and cancellation fees.

Each city and county has the discretion to determine which land uses are compatible with Williamson Act contracts within their jurisdiction, provided these uses are not prohibited under the Act.

California Public Resources Code

Public Resources Code (PRC) Section 12220(g) defines "forest land" as "land that can support 10% native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits." PRC Section 4526 defines "Timberland" as "land, other than land owned by the federal government…which is available for, and capable of, growing a crop of trees of a commercial species used to produce lumber and other forest products, including Christmas trees…."

Local

East County Area Plan

The Land Use Element of the *East County Area Plan* (Alameda County 2000) contains goals, policies, and programs related to Sensitive Lands and Regionally Significant Open Space, including Agriculture. The following goals, policies, and programs are applicable to the Project.

Goal: To protect regionally significant open space and agriculture land from development.

Policy 52: The County shall preserve open space areas for the protection of public health and safety, provision of recreational opportunities, production of natural resources (e.g., agriculture, windpower, and mineral extraction), protection of sensitive viewsheds (see definition in Table 1 [of East County Area Plan]), preservation of biological resources, and the physical separation between neighboring communities (see Figure 4 [of East County Area Plan]).

Goal: To maximize long-term productivity of East County's agricultural resources.

Policy 71: The County shall conserve prime soils (Class I and Class II, as defined by the USDA Soil Conservation Service Land Capability Classification) and Farmland of Statewide Importance and Unique Farmland (as defined by the California Department of Conservation Farmland Mapping and Monitoring Program) outside the Urban Growth Boundary.

Policy 76: The County shall work with San Joaquin, Contra Costa, and Santa Clara Counties to ensure that any development adjacent to Alameda County agricultural land mitigates impacts on agricultural land including air quality, water quality, and incompatibilities with agricultural uses. In particular, measures to mitigate growth-inducing impacts of development on agricultural land in Alameda County shall be addressed through cooperative efforts among the counties. The County shall ensure that land uses within Alameda County adjacent to San Joaquin, Contra Costa, and Santa Clara Counties are compatible with adjacent agricultural uses in these other counties.

Program 40: The Zoning Ordinance shall have an "A-160" (Agriculture—160-acre minimum parcel size) District and an "A-320" (Agriculture—320-acre minimum parcel size) District. The "A-160" (Agriculture—160-acre minimum parcel size) District shall cover the following area: the Wind Resource Area (see Figure 4 - Open Space Diagram [of East County Area Plan]), except lands easterly of the California Aqueduct, and lands to the south of Tesla Road that are within one mile of Tesla Road between the San Joaquin County boundary and the South Livermore Valley Plan. The "A-320" (Agriculture—320-acre minimum parcel size) District shall cover lands located generally to the south of the following boundary: parallel to and one mile south of Tesla Road from the San Joaquin County boundary to the South Livermore Valley Plan Area; the southern boundary of the South Livermore Valley Plan Area; parallel to and one mile south of Vallecitos Road from the South Livermore Valley Plan Area to the intersection of the one mile line with the northern boundary of San Francisco Water Department lands surrounding San Antonio Reservoir; the northern boundary of the San Francisco Water Department lands to the north/south section line directly west of San Antonio Reservoir; a line following the north/south section line to its intersection with Calaveras Road; and the northern boundary of the East Bay Regional Park District property located between Calaveras Road and the western boundary of the East County planning area. The Zoning Ordinance shall include "grandfather clauses" to recognize the rights of property owners. Lands rezoned to "A-160" and "A-320" shall maintain the designations shown on the East County Area Plan Land Use Diagram.

Zoning Ordinance (Alameda County Code, Title 17)

The Project area is zoned A (Agricultural District). This zoning district protects existing agricultural uses and encourages a wide range of agricultural uses in nonurban areas. Certain nonagricultural uses, including privately owned wind-electric generators, are considered conditional uses and are permitted in an A district if approved by the board of zoning adjustments.

Right to Farm

Alameda County's "Right-to-Farm" ordinance is set forth in Chapter 6.28 of the Municipal Code. This ordinance is designed to promote public health, safety and welfare, and to support and encourage continued agricultural operations in the county. A Right-to-Farm ordinance protects farmland by requiring disclosure to purchasers and users of property next to or near agricultural operations of the inherent potential problems associated with living near actively farmed land.

Environmental Setting

The environmental setting for agriculture comprises the location of agricultural lands, the type of crops, the FMMP farmland classifications, and lands designated under the Williamson Act in the program area.

State Farmland Classifications

The majority of the program area (approximately 41,229 acres) is designated as Grazing Land and is primarily used for cattle grazing (California Department of Conservation 2016a). Table 3.2-1 presents a summary of agricultural acreage found in the program area.

Table 3.2-1. FMMP Acreage in the Program Area

FMMP Land Cover	Acres
Urban and Built-up Land	1,010.22
Grazing Land	41,229.10
Prime Farmland	23.14
Farmland of Statewide Importance	0.33
Water	169.93
Other Land	937.46
Total	43,370.21

Source: California Department of Conservation 2016a.

Farmland Conversion

The FMMP also produces a report every 2 years on the amount of land converted from agricultural to nonagricultural use. Table 3.2-2 summarizes recent changes to FMMP-classified agricultural land in Alameda County. The county experienced a net loss of 314 acres of agricultural land from 2014 to 2016. Farmland in the program area is shown on Figure 3.2-1.

Table 3.2-2. Alameda County Farmland Conversions 2014–2016

	Total Acres Inventoried		2014–2016 Acreage Changes		
Land Use Category	2014	2016	Acres Lost	Acres Gained	Net Change
Prime Farmland	3,432	3,392	94	54	-40
Farmland of Statewide Importance	1,111	1,127	66	82	16
Unique Farmland	2,259	2,153	144	38	-106
Farmland of Local Importance	0	0	0	0	0
Grazing Land	241,170	240,986	709	525	-184
Agricultural Land Subtotal	247,972	247,658	1,013	699	-314

Source: California Department of Conservation 2016b.

Williamson Act Lands

Approximately 135,031 acres of County farmland were enrolled in Williamson Act contracts in 2009 (California Department of Conservation 2010). Figure 3.2-2 shows the Williamson Act parcels in the program area. Approximately 31,420 acres of land under Williamson Act contracts are located in the program area. All the Williamson Act-contracted land in the program area, including in the Project area, is Non–Prime Farmland

Crops and Livestock

The PEIR states that Alameda County's top five agricultural products in 2011 in terms of value were wine grapes, ornamental trees and shrubs, cattle and calves, range pasture, and hay (Alameda County Community Development Agency 2012). The top agricultural products were similar in 2017: wine grapes, cattle and calves, ornamental trees and shrubs, range and pasture, and miscellaneous vegetables (Alameda County Community Development Agency2018). The primary crop in the program area, including the Project area, was and continues to be pasture and range, which is primarily used for cattle grazing.

Forestry Resources

The Altamont Hills, including the Project area, are dominated by grassland and not likely to support 10% native tree cover under natural conditions because the soils, in combination with annual rainfall and other climatic conditions, are not conducive to the specified distribution of oak or other tree species. There are no forestry resources in either the program area or the Project area.

3.2.2 Environmental Impacts

This section presents the impact analysis relating to Project effects on agricultural resources. It describes the methods used to determine the impacts of the Project and lists the thresholds used to conclude whether an impact would be significant.

Methods for Analysis

Identifying the impacts on the Project area's agricultural resources involved a review of the Alameda County Zoning Map and zoning ordinance and the Alameda County Important Farmland 2016 map.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the proposed Project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the FMMP of the California Resources Agency, to nonagricultural use.
- Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract.
- Conflict with existing zoning for, or cause rezoning of forest land (as defined in PRC Section 12220[g]), timberland (as defined by PRC Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104[g]).
- Loss of forest land or conversion of forest land to non-forest use.
- Other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to nonagricultural use or conversion of forest land to non-forest use.

Impacts and Mitigation Measures

Program Changes

The changes in the Project described in Chapter 2 would not result in any changes in the location of program elements on Important Farmland or Williamson Act lands. For this reason, there would be no changes to the program impacts from those presented in the PEIR.

Project Impacts

Impact AG-1: Conversion of Important Farmland to nonagricultural use (no impact)

The Project area is located in the northeastern portion of the program area. The only Prime Farmland and Farmland of Statewide Importance in the program area is a small portion in the northeast corner of the program area. The Project area is entirely classified as Grazing Land and Urban/Built-up Land under the FMMP, and existing conditions include ongoing grazing (Figure 3.2-1 and Table 3.2-1). No Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Important Farmland) is present within the Project area (California Department of Conservation 2016a).

Some land would be used temporarily as staging areas. Some existing roads would be widened to accommodate construction activities, and some new service roads would be developed. Land would also be used to construct foundations for the new wind turbines.

The land used temporarily for construction purposes would be reclaimed. The construction staging areas would be reclaimed, and, after construction, the new or widened roads that are not wanted by landowners would also be reclaimed. The applicant will be required to remove all facilities and restore properties to pre-installation conditions once the windfarm is decommissioned.

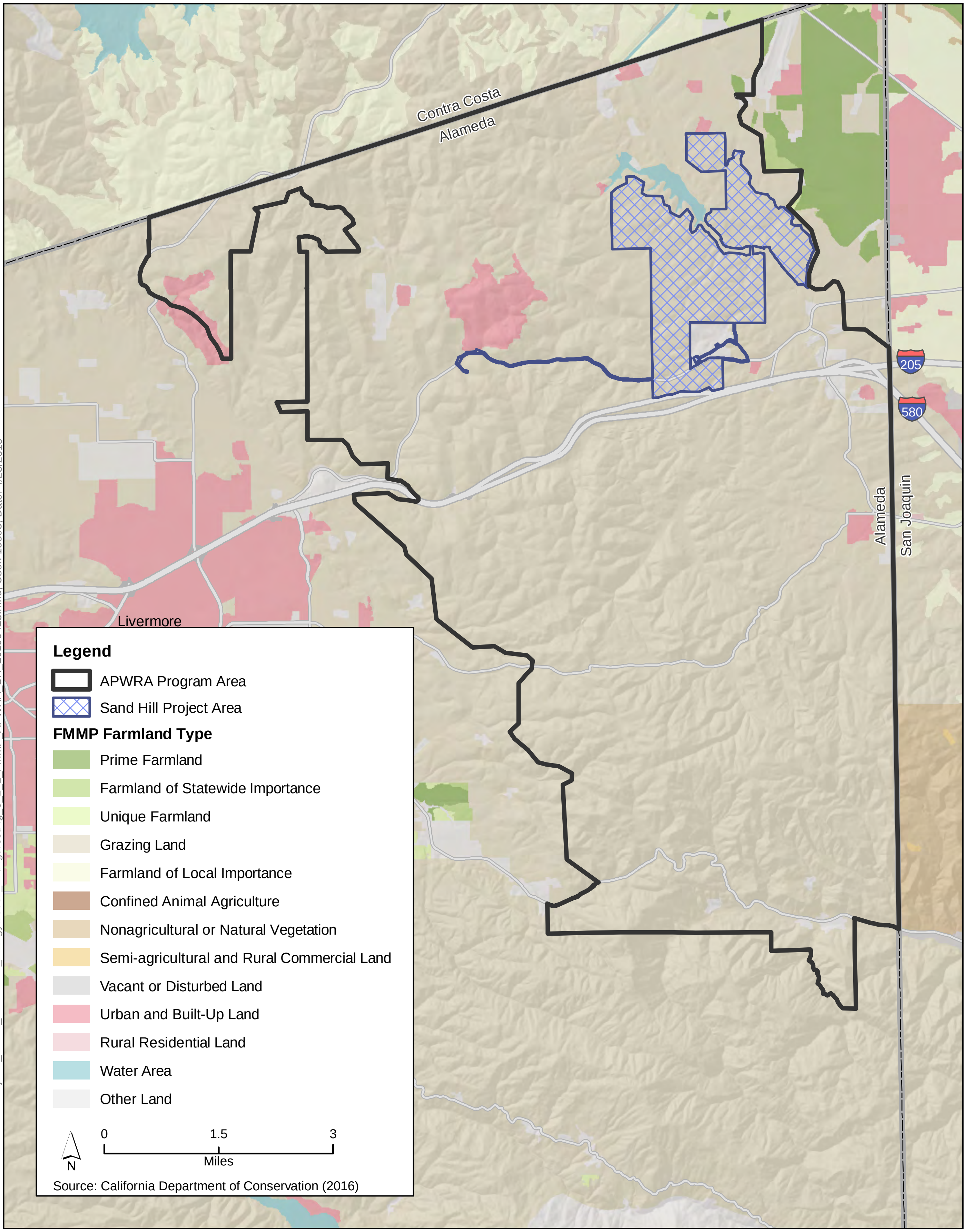

Figure 3.2-1
Farmland Types in the Program Area

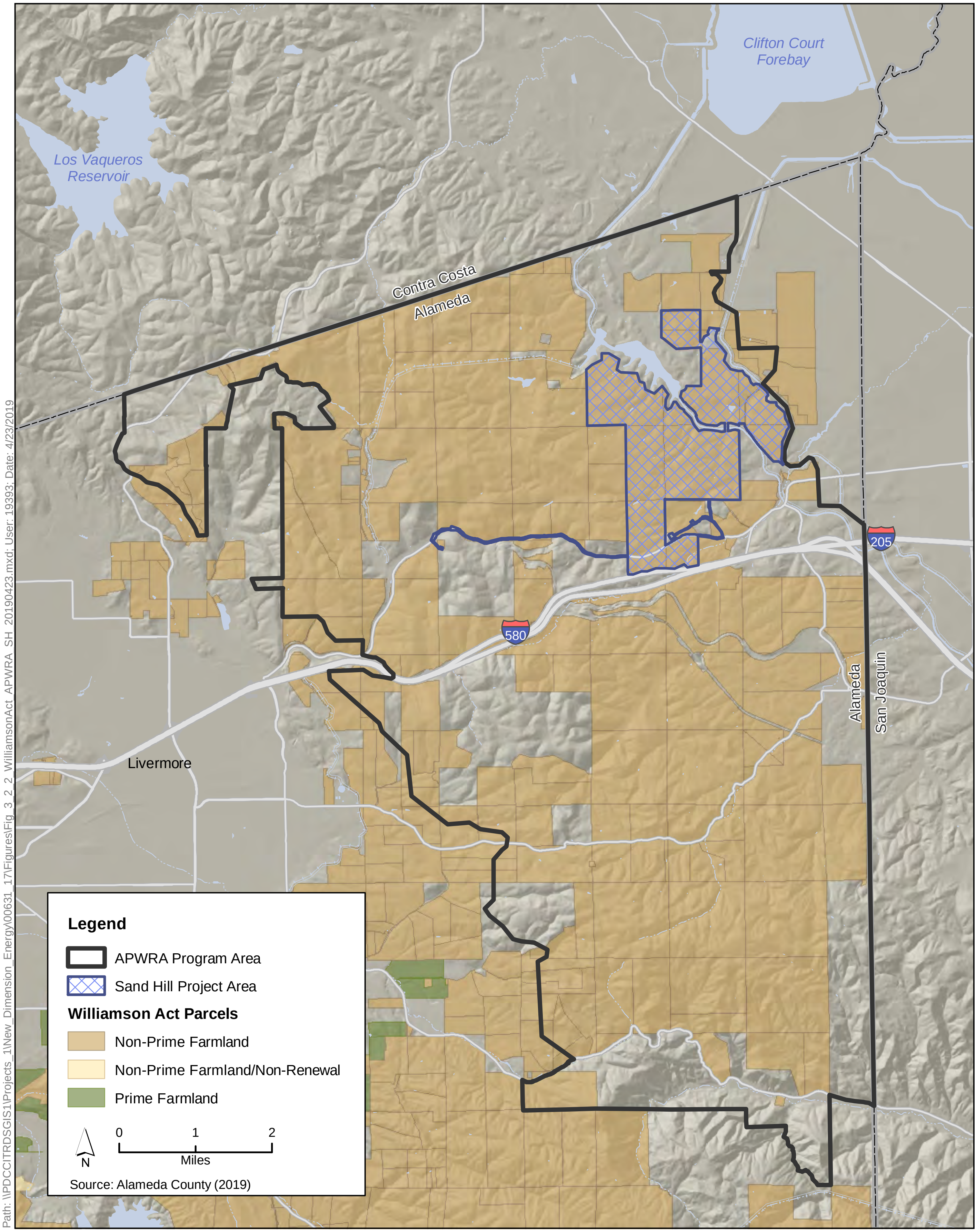

Figure 3.2-2
Williamson Act Lands in the Program Area

Because installation of new turbines or associated facilities would not result in the permanent conversion of Prime Farmland or Farmland of Statewide Importance to nonagricultural uses, there would be no impact. No mitigation is required.

Impact AG-2: Conflict with existing zoning for agricultural use or with a Williamson Act contract (no impact)

Chapter 17.06.040 of the Alameda County Code of Ordinances indicates that privately owned wind electric generators are a conditionally permitted use on non-prime farmland within the A District (Alameda County 2019). No prime farmland is present within or near the Project area and, as shown in Figure 3.2-2, all the Williamson Act land in the program area is non-prime farmland. Wind turbines are a compatible use allowed under the Williamson Act contracts covering the Project area. The replacement of wind turbine towers on land currently under Williamson Act contract would not remove the land from Williamson Act contract status. There would be no impact. No mitigation is required.

Impact AG-3: Conflict with existing zoning of forest land, timberland, or timberland zoned Timberland Production (no impact)

No land zoned as forest land or timberland is located within or in the immediate vicinity of the Project area. Accordingly, the Project would not conflict with existing zoning, or cause rezoning, of forest land or timberland. There would be no impact. No mitigation is required.

Impact AG-4: Loss of forest land or conversion of forest land to non-forest use (no impact)

No forest land exists in the Project area; consequently, the Project would not cause the loss or conversion of forest land to non-forest use. There would be no impact. No mitigation is required.

Impact AG-5: Potential to cause changes in the existing environment that could result in conversion of Farmland to nonagricultural use or conversion of forest land to non-forest use (no impact)

No Prime Farmland or Farmland of Statewide Importance is located in the Project area. Similarly, because no land in the Project area meets the definition of forest land, the Project would not result in conversion of forest land to non-forest use. There would be no impact. No mitigation is required.

3.2.3 References Cited

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3.3 Air Quality

This section examines the degree to which the proposed Project may result in changes to regional and local air quality. This section also describes the applicable regulatory framework, existing ambient air quality conditions of the Project area, and characteristics and effects of air pollutants. The Project area is located in unincorporated Alameda County, which is within the San Francisco Bay Area Air Basin (SFBAAB) and where most of the emissions would be occurring. Some emissions would be occurring in the San Joaquin Valley Air Basin (SVAB). The impact analysis focuses on the primary criteria pollutants that would be generated by the Project, which are carbon monoxide (CO), particulate matter 10 microns or less in diameter (PM10) and 2.5 microns or less in diameter (PM2.5), sulfur dioxide (SO_2), and the ozone precursors reactive organic gases (ROG) and nitrogen oxides (NO_X).

3.3.1 Existing Conditions

Regulatory Setting

The federal Clean Air Act (CAA) and its subsequent amendments form the basis for the nation's air pollution control effort. The U.S. Environmental Protection Agency (EPA) is responsible for implementing most aspects of the CAA. A key element of the CAA is the National Ambient Air Quality Standards (NAAQS) for criteria pollutants. The CAA delegates enforcement of the NAAQS to the states. In California, the California Air Resources Board (CARB) is responsible for enforcing air pollution regulations and ensuring the NAAQS and California Ambient Air Quality Standards (CAAQS) are met. CARB, in turn, delegates regulatory authority for stationary sources and other air quality management responsibilities to local air agencies. The Bay Area Air Quality Management District (BAAQMD) is the local air agency for the Project area. The following sections provide more detailed information on federal, state, and local air quality regulations that apply to the Project.

Federal Regulations

Clean Air Act

The CAA was first enacted in 1963 and has been amended numerous times in subsequent years (1965, 1967, 1970, 1977, and 1990). The CAA establishes federal air quality standards, known as NAAQS, for six criteria pollutants and specifies future dates for achieving compliance. The CAA also mandates that the states submit and implement a State Implementation Plan (SIP) for local areas not meeting those standards. The plans must include pollution control measures that demonstrate how the standards will be met.

The 1990 amendments to the CAA identify specific emission-reduction goals for areas not meeting the NAAQS. These amendments require both a demonstration of reasonable further progress toward attainment and incorporation of additional sanctions for failure to attain or meet interim milestones. Table 3.3-1 shows the NAAQS currently in effect for each criteria pollutant, as well as the CAAQS (discussed further below).

Table 3.3-1. Federal and State Ambient Air Quality Standards

Criteria Pollutant	Average Time	California Standards	National Standards[a]	
			Primary	Secondary
Ozone	1-hour	0.09 ppm	None[b]	None[b]
	8–hour	0.070 ppm	0.070 ppm	0.070 ppm
Particulate Matter (PM10)	24-hour	50 μg/m³	150 μg/m³	150 μg/m³
	Annual mean	20 μg/m³	None	None
Fine Particulate Matter (PM2.5)	24-hour	None	35 μg/m³	35 μg/m³
	Annual mean	12 μg/m³	12.0 μg/m³	15 μg/m³
Carbon Monoxide	8-hour	9.0 ppm	9 ppm	None
	1-hour	20 ppm	35 ppm	None
Nitrogen Dioxide	Annual mean	0.030 ppm	0.053 ppm	0.053 ppm
	1-hour	0.18 ppm	0.100 ppm	None
Sulfur Dioxide[c]	Annual mean	None	0.030 ppm	None
	24-hour	0.04 ppm	0.014 ppm	None
	3-hour	None	None	0.5 ppm
	1-hour	0.25 ppm	0.075 ppm	None
Lead	30-day Average	1.5 μg/m³	None	None
	Calendar quarter	None	1.5 μg/m³	1.5 μg/m³
	3-month average	None	0.15 μg/m³	0.15 μg/m³
Sulfates	24-hour	25 μg/m³	None	None
Visibility-Reducing Particles	8-hour	–[d]	None	None
Hydrogen Sulfide	1-hour	0.03 ppm	None	None
Vinyl Chloride	24-hour	0.01 ppm	None	None

Source: California Air Resources Board 2016.

ppm= parts per million; μg/m³ = micrograms per cubic meter; NAAQS = National Ambient Air Quality Standard; SO_2 = sulfur dioxide; CAAQS = California Ambient Air Quality Standard.

[a] National standards are divided into primary and secondary standards. Primary standards are intended to protect public health, whereas secondary standards are intended to protect public welfare and the environment.

[b] The federal 1-hour standard of 12 parts per hundred million was in effect from 1979 through June 15, 2005. The revoked standard is referenced because it was employed for such a long period and is a benchmark for State Implementation Plans.

[c] The annual and 24-hour NAAQS for SO_2 only apply for 1 year after designation of the new 1-hour standard to those areas that were previously in nonattainment for 24-hour and annual NAAQS.

[d] CAAQS for visibility-reducing particles is defined by an extinction coefficient of 0.23 per kilometer – visibility of 10 miles or more due to particles when relative humidity is less than 70%.

Non-Road Diesel Rule

EPA has established a series of increasingly strict emission standards for new off-road diesel equipment, on-road diesel trucks, and locomotives. New equipment used for activities within the Project area, including heavy-duty trucks and off-road construction equipment, would be required to comply with these emission standards.

State Regulations

California Clear Air Act

In 1988, the state legislature adopted the California Clean Air Act (CCAA), which established a statewide air pollution control program. The CCAA requires all air districts in the state to endeavor to meet the CAAQS by the earliest practical date. Unlike the CAA, the CCAA does not set precise attainment deadlines. Instead, the CCAA establishes increasingly stringent requirements for areas that will require more time to achieve the standards. CAAQS are generally more stringent than NAAQS and incorporate additional standards for sulfates, hydrogen sulfide, visibility-reducing particles, and vinyl chloride. The CAAQS and NAAQS are shown in Table 3.3-1.

CARB and local air districts bear responsibility for meeting the CAAQS, which are to be achieved through district-level air quality management plans incorporated into the SIP. In California, EPA has delegated authority to prepare SIPs to CARB, which, in turn, has delegated that authority to individual air districts. CARB traditionally has established state air quality standards, maintaining oversight authority in air quality planning, developing programs for reducing emissions from motor vehicles, developing air emission inventories, collecting air quality and meteorological data, and approving SIPs.

The CCAA substantially adds to the authority and responsibilities of air districts. The CCAA designates air districts as lead air quality planning agencies, requires air districts to prepare air quality plans, and grants air districts authority to implement transportation control measures. The CCAA also emphasizes the control of “indirect and area-wide sources” of air pollutant emissions. The CCAA gives local air pollution control districts explicit authority to regulate indirect sources of air pollution and to establish traffic control measures.

Statewide Truck and Bus Regulation

Originally adopted in 2005, the on-road truck and bus regulation requires heavy trucks to be retrofitted with particulate matter filters. The regulation applies to privately and federally-owned diesel-fueled trucks with a gross vehicle weight rating greater than 14,000 pounds. Compliance with the regulation can be reached through one of two paths: (1) vehicle retrofits according to engine year or (2) phase-in schedule. Compliance paths ensure that by January 2023, nearly all trucks and buses will have 2010 model year engines or newer.

State Tailpipe Emission Standards

Like EPA at the federal level, CARB has established a series of increasingly strict emission standards for new off-road diesel equipment, on-road diesel trucks, and harbor craft operating in California. New equipment used for construction and operation activities would be required to comply with the standards.

Carl Moyer Program

The Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program) is a voluntary program that offers grants to owners of heavy-duty vehicles and equipment. The program is a partnership between CARB and the local air districts throughout the state to reduce air pollution emissions from heavy-duty engines. Locally, the air districts administer the Carl Moyer Program.

Toxic Air Contaminant Regulations

California regulates toxic air contaminants (TACs) primarily through the Toxic Air Contaminant Identification and Control Act (Tanner Act) and the Air Toxics "Hot Spots" Information and Assessment Act of 1987 (Hot Spots Act). In the early 1980s, CARB established a statewide comprehensive air toxics program to reduce exposure to air toxics. The Tanner Act created California's program to reduce exposure to air toxics. The Hot Spots Act supplements the Tanner Act by requiring a statewide air toxics inventory, notification of people exposed to a significant health risk, and facility plans to reduce these risks.

CARB has identified diesel particulate matter (DPM) as a TAC and has approved a comprehensive *Diesel Risk Reduction Plan* to reduce emissions from both new and existing diesel-fueled engines and vehicles. The goal of the plan is to reduce DPM emissions and the associated health risk by 75 percent by 2010 and by 85 percent by 2020. The plan identifies 14 measures that CARB will implement over the next several years. The Project would be required to comply with any applicable diesel control measures from the *Diesel Risk Reduction Plan*.

Regional and Local Regulations

At the regional level, responsibilities of air quality districts include overseeing stationary-source emissions, approving permits, maintaining emissions inventories, maintaining air quality stations, overseeing agricultural burning permits, and reviewing air quality–related sections of environmental documents required by CEQA. The air quality districts are also responsible for establishing and enforcing local air quality rules and regulations that address the requirements of federal and state air quality laws and for ensuring that NAAQS and CAAQS are met. The Project area falls under the jurisdiction of the BAAQMD, but some emissions would occur in areas under the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD). Applicable plans and regulations from the air districts are presented below.

Bay Area Air Quality Management District

The BAAQMD is responsible for ensuring the NAAQS and CAAQS are met within the SFBAAB. BAAQMD manages air quality through a comprehensive program that includes long-term planning, regulations, incentives for technical innovation, education, and community outreach. The *2017 Clean Air Plan* provides an integrated strategy to reduce ozone, PM, and TACs in a manner that is consistent with federal and state air quality programs and regulations. BAAQMD's 2017 *Clean Air Plan* includes a wide range of proposed control measures to reduce combustion-related activities and decrease fossil fuel combustion (Bay Area Air Quality Management District 2017a).

The BAAQMD's *CEQA Guidelines* (2017b) provide guidance for evaluating project-level air quality impacts. The guidelines also contain thresholds of significance for ozone (ROG), NOx, CO, PM2.5, PM10, TACs, and odors. As stated in Appendix G of the State CEQA Guidelines, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the checklist determinations. The BAAQMD's thresholds, as outlined in its *CEQA Guidelines*, are summarized in Table 3.3-2.

Table 3.3-2. BAAQMD Thresholds of Significance

Pollutant	Construction	Operations
ROG	54 pounds/day	54 pounds/day or 10 tons/year
NO_X	54 pounds/day	54 pounds/day or 10 tons/year
CO	–	Violation of CAAQS
PM10 (exhaust)	82 pounds/day	82 pounds/day or 15 tons/year
PM2.5 (exhaust)	54 pounds/day	54 pounds/day or 10 tons/year
PM10 /PM2.5 (dust)	Best management practices	–
TACs (project-level)	Increased cancer risk of 10 in 1 million; increased non-cancer risk of greater than 1.0 HI; PM2.5 increase of greater than 0.3 micrograms per cubic meter	Same as construction
TACs (cumulative)	Increased cancer risk of 100 in 1 million; increased non-cancer risk of greater than 10.0; PM2.5 increase of greater than 0.8 microgram per cubic meter at receptors within 1,000 feet	Same as construction
Odors	–	Five complaints per year averaged over 3 years

Source: Bay Area Air Quality Management District 2017b.

CAAQS = California Ambient Air Quality Standards; CO = carbon monoxide; HI = hazard index; NO_X = nitrogen oxide; PM 2.5 = particulate matter no more than 2.5 microns in diameter; PM10 = particulate matter no more than 10 microns in diameter; ROG = reactive organic gases; TACs = toxic air contaminants.

In addition, BAAQMD develops and adopts various rules to reduce emissions throughout the SFBAAB. The Project may be subject to the following district rules.

- Regulation 6, Rule 1 (Particulate Matter): This regulation restricts emissions of particulate matter darker than No. 1 on the Ringlemann Chart to less than 3 minutes in any 1 hour.
- Regulation 9, Rule 8 (Stationary Internal-Combustion Engines): This regulation limits emissions of NO_X and CO from stationary internal-combustion engines of more than 50 horsepower.

San Joaquin Valley Air Pollution Control District

SJVAPCD has adopted CEQA emission thresholds in its *Guidance for Assessing and Mitigating Air Quality Impacts* to assist lead agencies in determining the level of significance of project-related emissions (San Joaquin Valley Air Pollution Control District 2015a). According to the SJVAPCD guidance, emissions that exceed the recommended threshold levels are considered potentially significant and should be mitigated where feasible. Table 3.3-3 presents SJVAPCD's thresholds for construction and operation.

Table 3.3-3. SJVAPCD Criteria Pollutant Thresholds

Pollutant	Construction	Operations
ROG	10 tons/year	10 tons/year
NO_X	10 tons/year	10 tons/year
CO	100 tons/year	100 tons/year
PM10	15 tons/year	15 tons/year
PM2.5	15 tons/year	15 tons/year
SO_X	27 tons/year	27 tons/year

Source: San Joaquin Valley Air Pollution Control District 2015a.
CO = carbon monoxide; NO_X = nitrogen oxides; PM10 = particulate matter; PM2.5 = fine particulate matter; ROG = reactive organic compounds; SO_X = sulfur oxides.

The SJVAPCD's guidance also introduced screening-level thresholds for construction and operational emissions to help determine when an ambient air quality analysis (AAQA) must be performed. An ambient air quality analysis would entail the use of air dispersion modeling to determine whether emission increases from a proposed project will cause or contribute to a violation of the CAAQS or NAAQS. The SJVAPCD's AAQA screening-level thresholds are 100 pounds per day of any criteria pollutant; projects with emissions in excess of this threshold would require dispersion modeling, while projects below this threshold are presumed to not result in a violation of the CAAQS or NAAQS.

Under the CCAA, SJVAPCD is also required to develop an air quality plan for nonattainment criteria pollutants in the air district. The air district has adopted attainment plans to address ozone, and particulate matter (PM). The *2016 Ozone Plan* contains a comprehensive list of regulatory and incentive-based measures to reduce reactive organic gases (ROG) and nitrogen oxides (NO_X) emissions (San Joaquin Valley Air Pollution Control District 2016). In particular, the plan proposes a 60% reduction in NO_X by 2031. SJVAPCD's *2007 PM10 Maintenance Plan* and *2018 Plan for the 1997, 2006, and 2012 PM2.5 Standard* likewise include strategies to reduce PM emissions throughout the air basin.

The Project may be subject to the following district rules. This list of rules may not be all encompassing, as additional SJVAPCD rules may apply to the alternatives as specific components are identified. These are rules that have been adopted by SJVAPCD to reduce emissions throughout the San Joaquin Valley.

- Rule 2201 (New and Modified Stationary-Source Review Rule). This rule applies to all new stationary sources and all modifications to existing stationary sources subject to SJVAPCD permit requirements that, after construction, emit or may emit one or more pollutants regulated by the rule.
- Rule 3135 (Dust Control Plan Fees). This rule requires the applicant to submit a fee in addition to a dust control plan. The purpose of this rule is to recover SJVAPCD's cost for reviewing these plans and conducting compliance inspections.
- Rule 4101 (Visible Emissions). This rule prohibits emissions of visible air contaminants to the atmosphere and applies to any source operation that emits or may emit air contaminants.

- Rule 4102 (Nuisance). This rule applies to any source operation that emits or may emit air contaminants or other materials. In the event that Project operation or construction create a public nuisance, the Project could be in violation and subject to SJVAPCD enforcement action.
- Rule 4701 (Internal Combustion Engines—Phase 1). This rule limits the emissions of NO_X, CO, and ROG from internal combustion engines. These limits are not applicable to standby engines as long as they are used fewer than 200 hours per year (e.g., for testing during non-emergencies).
- Rule 4702 (Internal Combustion Engines—Phase 2). This rule limits the emissions of NO_X, CO, and ROG from spark-ignited internal combustion engines.
- Regulation VIII (Fugitive PM10 Prohibitions). This is a series of rules (Rules 8011–8081) designed to reduce PM emissions (predominantly dust/dirt) generated by human activity, including construction, road construction, bulk materials storage, landfill operations, and other activities. The Project would be required to comply with Regulation VIII by law.

Environmental Setting

Climate and Meteorology

San Francisco Bay Area Air Basin

The primary factors that determine air quality are the locations of air pollutant sources and the amount of pollutants emitted from those sources. Meteorological and topographical conditions are also important factors. Atmospheric conditions, such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants. Air quality is indicated by ambient concentrations of criteria pollutants: ozone, CO, NO_2, SO_2, lead, PM10, and PM2.5.

The Project area is located approximately 3 miles east of the City of Livermore, in unincorporated Alameda County, which is within the SFBAAB. The SFBAAB has a Mediterranean climate characterized by hot, dry summers and cool, rainy winters. During the year, temperatures in Livermore range from 37 degrees Fahrenheit (°F) during the night to 89°F during the day. Average annual rainfall is approximately 14 inches, with roughly 80% of the total precipitation falling during the rainy season (generally from November through March) (Western Regional Climate Center 2016). The SFBAAB lies in the semi-permanent high-pressure zone of the eastern Pacific, resulting in a mild climate tempered by cool sea breezes with light average wind speeds.

The mountains surrounding the SFBAAB create a barrier to airflow, which can trap air pollutants under certain meteorological conditions. The highest frequency of air stagnation occurs in early winter. The lack of surface wind during these periods combined with the reduced vertical flow caused by less surface heating results in a lower influx of outside air and allows air pollutants to become concentrated in a stable volume of air. The surface concentrations of pollutants are highest when these conditions are combined with smoke or when temperature inversions trap cool air, fog, and pollutants near the ground.

San Joaquin Valley Air Basin

Climate within the San Joaquin Valley Air Basin (SJVAB) is characterized by sparse rainfall, which occurs mainly in winter. Summers are hot and dry. Summertime maximum temperatures often exceed 100°F.

Climate is modified by topography. The bowl shaped topography inhibits movement of pollutants out of the SJVAB and creates climatic conditions that are particularly conducive to air pollution formation. Wind speed and direction play an important role in dispersion and transport of air pollutants. Wind at the surface and aloft can disperse pollution by mixing and by transporting the pollution to other locations. Two significant diurnal wind cycles that occur frequently in the San Joaquin Valley are the sea breeze, and the mountain-valley upslope and drainage flows. The sea breeze can accentuate the northwest wind flow, especially on summer afternoons. Nighttime drainage flows can accentuate the southeast movement of air down the valley.

The vertical dispersion of air pollutants in the SJVAB can be limited by persistent temperature inversions. Air temperature in the lowest layer of the atmosphere typically decreases with altitude. A reversal of this atmospheric state, where the air temperature increases with height, is termed an inversion. The height of the base of the inversion is known as the “mixing height.” This is the level to which pollutants can mix vertically. Mixing of air is minimized above and below the inversion base. The inversion base represents an abrupt density change where little air movement occurs.

Inversion layers are significant in determining pollutant concentrations. Concentration levels can be related to the amount of mixing space below the inversion. Temperature inversions that occur on the summer days are usually encountered 2,000 to 2,500 feet above the valley floor. In winter months, overnight inversions occur 500 to 1,500 feet above the valley floor (San Joaquin Valley Air Pollution Control District 2015a).

Pollutants of Concern

Criteria Air Pollutants

As discussed above, the federal and state governments have established NAAQS and CAAQS, respectively, for six criteria pollutants. Ozone and NO_2 are considered regional pollutants because they (or their precursors) affect air quality on a regional scale. Pollutants such as CO, SO_2, and lead are considered local pollutants that tend to accumulate in the air locally.

The primary criteria pollutants generated by the Project would be ozone precursors (NO_X and ROG), CO, particulate matter, and SO_2. Principal characteristics of these pollutants are discussed below.

Ozone, or smog, is a photochemical oxidant that is formed when ROG and NO_X (both byproducts of the internal combustion engine) react with sunlight. Ozone poses a health threat to those who already suffer from respiratory diseases as well as to healthy people. Additionally, ozone has been tied to crop damage, typically in the form of stunted growth and premature death. Ozone can also act as a corrosive, resulting in property damage such as the degradation of rubber products.

Reactive Organic Gases are compounds made up primarily of hydrogen and carbon atoms. Internal combustion associated with motor vehicle usage is the major source of hydrocarbons. Other sources of ROG are emissions associated with the use of paints and solvents, the application of asphalt paving, and the use of household consumer products such as aerosols. Adverse effects on human health are not caused directly by ROG but rather by reactions of ROG to form secondary pollutants such as ozone.

Nitrogen Oxides serve as integral participants in the process of photochemical smog production. The two major forms of NO_X are nitric oxide (NO) and NO_2. NO is a colorless, odorless gas formed from atmospheric nitrogen and oxygen when combustion takes place under high temperature and/or high pressure. NO_2 is a reddish-brown irritating gas formed by the combination of NO and oxygen. NO_X acts as an acute respiratory irritant and increases susceptibility to respiratory pathogens.

Carbon Monoxide is a colorless, odorless, toxic gas produced by incomplete combustion of carbon substances, such as gasoline or diesel fuel. The primary adverse health effect associated with CO is interference with normal oxygen transfer to the blood, which may result in tissue oxygen deprivation.

Particulate Matter consists of finely divided solids or liquids such as soot, dust, aerosols, fumes, and mists. Two forms of fine particulates are now recognized—inhalable coarse particles, or PM10, and inhalable fine particles, or PM2.5. Particulate discharge into the atmosphere results primarily from industrial, agricultural, construction, and transportation activities. However, wind on arid landscapes also contributes substantially to local particulate loading. Both PM10 and PM2.5 may adversely affect the human respiratory system, especially in people who are naturally sensitive or susceptible to breathing problems.

Sulfur dioxide is generated by burning of fossil fuels, industrial processes, and natural sources, such as volcanoes. Short-term exposure to SO_2 can aggregative the respiratory system, making breathing difficult. SO_2 can also affect the environment by damaging foliage and decreasing plant growth.

Toxic Air Contaminants

Although NAAQS and CAAQS have been established for criteria pollutants, no ambient standards exist for TACs. Many pollutants are identified as TACs because of their potential to increase the risk of developing cancer or because of their acute or chronic health risks. For TACs that are known or suspected carcinogens, CARB has consistently found that there are no levels or thresholds below which exposure is risk-free. Individual TACs vary greatly in the risks they present. At a given level of exposure, one TAC may pose a hazard that is many times greater than another. TACs are identified and their toxicity is studied by the California Office of Environmental Health Hazard Assessment.

Air toxics are generated by many sources, including: stationary sources, such as dry cleaners, gas stations, auto body shops, and combustion sources; mobile sources, such as diesel trucks, ships, and trains; and area sources, such as farms, landfills, and construction sites. Adverse health effects of TACs can be carcinogenic (cancer-causing), short-term (acute) non-carcinogenic, and long-term (chronic) non-carcinogenic. Direct exposure to these pollutants has been shown to cause cancer, birth defects, damage to the brain and nervous system, and respiratory disorders. The principal TACs associated with the Project are DPM and asbestos[1].

[1] However, according to A General Location Guide for Ultramafic Rock in California, the Project area is not located in an area that is known to contain naturally occurring asbestos (California Department of Conservation 2000).

Odors

Offensive odors can be unpleasant and lead to considerable distress among the public. This distress often generates citizen complaints to local governments and air districts. According to CARB's (2005) *Air Quality and Land Use Handbook*, land uses associated with odor complaints typically include sewage treatment plants, landfills, recycling facilities, manufacturing, and agricultural activities. CARB provides recommended screening distances for siting new receptors near existing odor sources.

Existing Conditions

Ambient Air Quality Standards

The existing air quality conditions in the Project area can be characterized by various monitoring data collected in the region. Because of incomplete monitoring data, Table 3.3-4 summarizes data for criteria air pollutant levels from the Livermore-Patterson Pass Road, Livermore-Rincon Avenue, and Tracy Airport air quality monitoring stations, which are located approximately 4 miles south, 8 miles southwest, and 9 miles southeast of the Project area, respectively, for the 3 years from 2015 to 2017. Air quality concentrations are expressed in terms of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). As shown in Table 3.3-4, the monitoring stations detected numerous days when the federal and state ozone standards were exceeded, and two exceedances occasions when the federal PM2.5 standards were exceeded. No exceedances of federal or state PM10, CO, or NO_2 standards were reported.

Table 3.3-4. Ambient Air Quality Monitoring Data from Livermore-Patterson Pass Road, Livermore-Rincon Avenue, and Tracy Airport Monitoring Stations (2015–2017)

Pollutant	2015	2016	2017
Ozone (O_3) (Livermore-Patterson Pass Road)			
Maximum 1-hour concentration (ppm)	0.099	0.109	0.057
Maximum 8-hour concentration (ppm)	0.083	0.087	0.051
Number of days standard exceeded[a]			
CAAQS 1-hour (>0.09 ppm)	4	5	0
CAAQS 8-hour (>0.070 ppm)	6	15	0
NAAQS 8-hour (>0.070 ppm)	5	15	0
Carbon Monoxide (CO)			
No data available			
Nitrogen Dioxide (NO_2) (Livermore-Patterson Pass Road)			
State maximum 1-hour concentration (ppm)	0.018	0.023	0.012
State second-highest 1-hour concentration (ppm)	0.017	0.015	0.011
Annual average concentration (ppm)	*	*	*
Number of days standard exceeded			
CAAQS 1-hour (0.18 ppm)	0	0	0

Pollutant	2015	2016	2017
Particulate Matter (PM10)[c] (Tracy Airport)			
National[b] maximum 24-hour concentration (μg/m^3)	58.3	53.0	152.0
National[b] second-highest 24-hour concentration (μg/m^3)	57.1	45.7	85.4
State[c] maximum 24-hour concentration (μg/m^3)	*	*	*
State[c] second-highest 24-hour concentration (μg/m^3)	*	*	*
National annual average concentration (μg/m^3)	20.9	18.6	22.6
State annual average concentration (μg/m^3)[d]	*	*	*
Number of days standard exceeded[a]			
NAAQS 24-hour (>150 μg/m^3)[e]	0	0	0
CAAQS 24-hour (>50 μg/m^3)[e]	*	*	*
Particulate Matter (PM2.5) (Livermore-Rincon Avenue)			
National[b] maximum 24-hour concentration (μg/m^3)	31.1	22.3	41.5
National[b] second-highest 24-hour concentration (μg/m^3)	31.0	19.6	37.6
State[c] maximum 24-hour concentration (μg/m^3)	31.1	22.3	41.5
State[c] second-highest 24-hour concentration (μg/m^3)	31.0	19.6	37.6
National annual average concentration (μg/m^3)	8.7	7.4	8.4
State annual average concentration (μg/m^3)[d]	8.8	7.5	8.4
Number of days standard exceeded[a]			
NAAQS 24-hour (>35 μg/m^3)[e]	0	0	2
Sulfur Dioxide (SO_2)			
No data available			

Sources: California Air Resources Board 2019.

ppm = parts per million; NAAQS = National Ambient Air Quality Standards; CAAQS = California Ambient Air Quality Standards; μg/m^3 = micrograms per cubic meter; mg/m^3 = milligrams per cubic meter; > = greater than; * = insufficient data.

[a] An exceedance is not necessarily a violation.

[b] National statistics are based on standard conditions data. In addition, national statistics are based on samplers using federal reference or equivalent methods.

[c] State statistics are based on local conditions data, except in the South Coast Air Basin, for which statistics are based on standard conditions data. In addition, state statistics are based on California approved samplers.

[d] State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

[e] Mathematical estimate of how many days during which concentrations would have been measured as higher than the level of the standard had each day been monitored. Values have been rounded.

Attainment Status

Local monitoring data (Table 3.3-4) are used to designate areas as nonattainment, maintenance, attainment, or unclassified for the NAAQS and CAAQS. The four designations are further defined as shown below.

- Nonattainment—assigned to areas where monitored pollutant concentrations consistently violate the standard in question.
- Maintenance—assigned to areas where monitored pollutant concentrations exceeded the standard in question in the past but are no longer in violation of that standard.

- Attainment—assigned to areas where pollutant concentrations meet the standard in question over a designated period of time.
- Unclassified—assigned to areas where data are insufficient to determine whether a pollutant is violating the standard in question.

Tables 3.3-5 and 3.3-6 summarize the attainment status of Alameda and San Joaquin Counties with respect to the NAAQS and CAAQS.

Table 3.3-5. Federal and State Attainment Status of the Project Area in Alameda County

Pollutant	NAAQS	CAAQS
Ozone	Marginal Nonattainment	Nonattainment
CO	Attainment	Attainment
PM10	Attainment	Nonattainment
PM2.5	Nonattainment	Nonattainment
SO_2	Attainment	Attainment
NO_2	Attainment	Attainment
Lead	Attainment	Attainment
Sulfates	No standard	Attainment
Visibility-Reducing Particles	No standard	Unclassified
Hydrogen Sulfide	No standard	Unclassified
Vinyl Chloride	No standard	Unclassified

Sources: U.S. Environmental Protection Agency 2019; California Air Resources Board 2017.

NAAQS = National Ambient Air Quality Standards; CAAQS = California Ambient Air Quality Standards; CO = carbon monoxide; PM10 = particulate matter 10 microns or less in diameter; PM2.5 = particulate matter 2.5 microns or less in diameter; SO_2 = sulfur dioxide; NO_2 = nitrogen dioxide.

Table 3.3-6. Federal and State Attainment Status of the Project Area in San Joaquin County

Pollutant	NAAQS	CAAQS
Ozone	Extreme Nonattainment	Nonattainment
CO	Attainment	Attainment
PM10	Serious Maintenance	Nonattainment
PM2.5	Moderate Nonattainment	Nonattainment
SO_2	Attainment	Attainment
NO_2	Attainment	Attainment
Lead	Attainment	Attainment
Sulfates	No standard	Attainment
Visibility-Reducing Particles	No standard	Unclassified
Hydrogen Sulfide	No standard	Unclassified
Vinyl Chloride	No standard	Unclassified

Sources: U.S. Environmental Protection Agency 2019; California Air Resources Board 2017.

NAAQS = National Ambient Air Quality Standards; CAAQS = California Ambient Air Quality Standards; CO = carbon monoxide; PM10 = particulate matter 10 microns or less in diameter; PM2.5 = particulate matter 2.5 microns or less in diameter; SO_2 = sulfur dioxide; NO_2 = nitrogen dioxide.

Sensitive Receptors

Sensitive land uses are defined as locations where human populations, especially children, seniors, and sick persons, are located and where there is reasonable expectation of continuous human exposure according to the averaging period for the air quality standards (i.e., 24-hour, 8-hour). Typical sensitive receptors are residences, hospitals, schools, and parks. The Project area consists largely of cattle-grazed land supporting operating wind turbines and ancillary facilities. There are a few scattered residences along Altamont Pass Road that are within 1,000 feet of the Project area.

3.3.2 Environmental Impacts

According to the State CEQA Guidelines, the significance criteria established by the applicable air quality management or air pollution control district may be relied on to make significance determinations for potential impacts on environmental resources. As discussed earlier in this section, BAAQMD is primarily responsible for ensuring that state and federal ambient air quality standards are not violated in Alameda County, and SJVAPCD is responsible for Project activities within its jurisdiction. Emissions thresholds for construction and operation are discussed under *Regulatory Setting* and are shown in Tables 3.3-2 and 3.3-3.

Methods for Analysis

Project construction emissions would primarily be in the BAAQMD. However, some equipment and materials would originate from the Port of Stockton and the city of Tracy, both of which are within the SJVAPCD. Accordingly, heavy-duty truck trip exhaust emissions that would be generated in the SJVAPCD have been quantified and included in the construction analysis. Operational emissions would be exclusively in the BAAQMD. Consistent with the PEIR, thresholds developed by the BAAQMD and SJVAPCD are used to evaluate the significance of the Project's emissions and associated air quality impacts (San Joaquin Valley Air Pollution Control District 2015a; Bay Area Air Quality Management District 2017b).

Analysts estimated combustion exhaust and fugitive dust based on Project-specific construction data (e.g., schedule, equipment, truck volumes) provided by the Project engineer and a combination of emission factors and methodologies from CalEEMod, version 2016.3.2; CARB's EMFAC2017 model; EPA's AP-42 Compilation of Air Pollutant Emission Factors, and several other industry-accepted tools. All major design components of the Project (e.g., road construction, turbine delivery) were quantitatively analyzed and included in the emissions modeling to ensure that emissions from construction and air quality impacts associated with the completed Project were accurately assessed. Operational criteria pollutant emissions were estimated for routine maintenance activities, worker commutes, and vehicle trips. Refer to Appendix B for the detailed modeling assumptions.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the proposed Project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Conflict with or obstruction of implementation of the applicable air quality plan.
- A cumulatively considerable net increase of any criteria pollutant for which the Project region is a nonattainment area for an applicable federal or state ambient air quality standard.

- Exposure of sensitive receptors to substantial pollutant concentrations.
- Generation of objectionable odors adversely affecting a substantial number of people.

Impacts and Mitigation Measures

Impact AQ-1: Conflict with or obstruction of implementation of the applicable air quality plan (less than significant)

The PEIR concluded that Altamont Pass Wind Resource Area repowering projects would not conflict with the goals of BAAQMD's *Clean Air Plan.* In order to determine that a project is consistent with the *Clean Air Plan,* it is necessary to demonstrate that proposed Project does not exceed the population or employment growth assumptions contained in the plans, which would lead to increased vehicle miles traveled beyond those estimated in the plan. Implementation of the proposed Project would result in no new permanent employees relative to existing conditions, nor would it increase population projections. Therefore, the proposed Project would not induce population or employment growth and would result in no net increase in vehicle miles traveled in the SFBAAB. The proposed Project's potential impacts on population and housing are discussed in Section 3.13, *Population and Housing*; potential transportation-related impacts are discussed in Section 3.16, *Traffic*.

In addition, short-term mitigated emissions resulting from proposed Project construction would not exceed the BAAQMD significance thresholds (see Impact AQ-2). Operational activities would be minimal and primarily include routine maintenance and monitoring. As such, operational emissions resulting from proposed Project operation would also not exceed the BAAQMD significance thresholds (see Impact AQ-2). The proposed Project would result in long-term benefits from new renewable wind-generated energy, including reduction of criteria pollutants relative to the production of comparable energy from fossil fuel sources. Thus, the proposed Project would be consistent with the *Clean Air Plan*. It is assumed that trucks transporting some components and aggregate would travel from the Port of Stockton and the city of Tracy through portions of the SJVAB to the program area. However, SJVAPCD rules and clean air plans would not be applicable to the proposed Project because the Project area is located in the SFBAAB. Therefore, no conflict with SJVAPCD's air quality attainment plans would occur.

Accordingly, because the Sand Hill Project is consistent with the assumptions used in the PEIR and for the reasons described above, this impact would be less than significant, and no mitigation is required.

Impact AQ-2: Cumulatively considerable net increase of any criteria pollutant for which the Project region is a nonattainment area for an applicable federal or state ambient air quality standard (construction: less than significant with mitigation and operation: less than significant)

The PEIR concluded that maximum daily unmitigated ROG and NO_X from construction of repowering projects would exceed BAAQMD's significance thresholds, resulting in a significant impact. Fugitive dust would also constitute a significant impact without application of best management practices (BMPs). Implementation of PEIR Mitigation Measures AQ-2a, *Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures*, and AQ-2b, *Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures*, would ensure that impacts related to fugitive dust would be less than significant. However, implementation of these measures would not reduce NO_X emissions to a less-than-significant level. Implementation of an additional mitigation measure, 2019 NEW Mitigation Measure AQ-2c*: Reduce construction-related air pollutant emissions to below BAAQMD NO_x thresholds* would, however, reduce NO_X emissions to a less-than-significant level. Neither long-term operation of the Project nor material hauling in SJVAPCD during construction would exceed any air district thresholds, and impacts would be less than significant.

Construction

Table 3.3-7 summarizes estimated unmitigated emissions in SJVAPCD from construction of the proposed Project. Emissions are presented in terms of tons per year and average pounds per day for comparison to SJVAPCD's (2015a) thresholds. Table 3.3-8 summarizes unmitigated emissions in the BAAQMD in terms of pounds per day. The total amount, duration, and intensity of construction activity could have a substantial effect on the amount of construction emissions, their concentrations, and the resulting impacts occurring at any one time. Consequently, the emission forecasts provided in this analysis reflect a specific set of conservative assumptions based on the expected construction scenario wherein a relatively large amount of construction takes place in a relatively intensive and overlapped schedule. Because of this conservative assumption, actual emissions could be less than those forecasted.

Table 3.3-7. Unmitigated Criteria Pollutants from Project Construction in SJVAPCD

	Average Pounds per Day[a]						Tons per Year					
Activity	ROG	NO_X	CO	SO_2	PM10	PM2.5	ROG	NO_X	CO	SO_2	PM10	PM2.5
Offsite truck trips	1	23	3	<1	4	1	<1	1	<1	<1	<1	<1
SJVAPCD threshold[b]	100	100	100	100	100	100	10	10	100	27	15	15
Significant Impact?	No	No	No	No	No	No	No	No	No	No	No	No

ROG = reactive organic gases; NO_X = nitrogen oxide; CO = carbon monoxide; PM10 = particulate matter that is 10 microns in diameter and smaller; PM2.5 = particulate matter that is 2.5 microns in diameter and smaller; SO_2 = sulfur dioxide.

[a] Presents average emissions during a single day of construction in each year, consistent with guidance for correct application of SJVAPCD's ambient air quality analysis screening criteria.

[b] The 100-pound-per-day threshold is a screening-level threshold to help determine whether increased emissions from a project will cause or contribute to a violation of the ambient air quality standards.

Table 3.3-8. Unmitigated Criteria Pollutants from Project Construction in BAAQMD

					PM10		PM2.5	
Activity	ROG	NO_X	CO	SO_2	Exhaust	Dust	Exhaust	Dust
Laydown, substations and switch yards	4	39	22	<1	1	24	1	12
Road construction	9	***81***	47	<1	3	34	3	23
Turbine foundations	14	***131***	74	<1	5	57	4	35
Turbine delivery and installation	3	38	23	<1	1	7	1	1
Utility collector line installation	2	19	11	<1	1	10	1	6
O&M building construction[a]	19	29	22	<1	2	7	2	6
Restoration and cleanup	4	37	19	<1	1	11	1	16
Offsite truck trips	2	41	9	<1	1	7	1	2
Offsite worker trips	<1	<1	4	<1	<1	3	<1	1
Maximum Daily[b]	50	***341***	188	1	12	142	12	84
BAAQMD (2017) threshold	54	54	–	–	82	BMPs	54	BMPs
Significant Impact?	No	***Yes***	No	No	No	***Yes***	No	***Yes***

ROG = reactive organic gases; NO_X = nitrogen oxide; CO = carbon monoxide; PM10 = particulate matter that is 10 microns in diameter and smaller; PM2.5 = particulate matter that is 2.5 microns in diameter and smaller; SO_2 = sulfur dioxide.

[a] The O&M building is no longer a part of the Project. Therefore, emissions presented in the daily total is conservative and will likely be lower than shown. However, the significance conclusions are not anticipated to change.

[b] Includes all construction activities except turbine delivery and installation, and restoration and cleanup, which would not occur during the period of maximum daily emissions.

As shown in Table 3.3-7, material hauling activity in SJVAPCD would not exceed any of the air district's thresholds of significance.

As shown in Table 3.3-8, NO_x emissions generated by road construction and turbine foundation construction would independently exceed BAAQMD's threshold of significance. Maximum daily emissions from overlapping activities would also exceed the threshold. Consistent with BAAQMD guidance, the impact of fugitive dust emission would also be potentially significant without implementation of BMPs.

PEIR Mitigation Measures AQ-2a and AQ-2b are required to reduce NO_x and fugitive dust emissions from Project construction. Implementation of an additional measure, 2019 NEW Mitigation Measure AQ-2c, would reduce the remaining NOx exceedance to a less-than-significant level. Table 3.3-9 summarizes mitigated emissions in the BAAQMD.

Table 3.3-9. Mitigated Criteria Pollutants from Project Construction in BAAQMD

					PM10		PM2.5	
Activity	ROG	NO_X	CO	SO_2	Exhaust	Dust	Exhaust	Dust
Laydown, substations and switch yards	4		22	<1	1	12	1	6
Road construction	9		47	<1	2	17	2	11
Turbine foundations	14		74	<1	3	30	3	16
Turbine delivery and installation	3		23	<1	1	4	1	0
Utility collector line installation	2	54	11	<1	<1	5	<1	3
O&M building construction[a]	19		22	<1	1	5	1	3
Restoration and cleanup	4		19	<1	1	5	1	7
Offsite truck trips	2		9	<1	1	7	1	2
Offsite worker trips	<1		4	<1	<1	3	<1	1
Maximum Daily[b]	50	54	188	1	8	80	7	41
BAAQMD (2017) threshold	54	54	–	–	82	BMPs	54	BMPs
Significant Impact?	No	No	No	No	No	No	No	No

ROG = reactive organic gases; NO_X = nitrogen oxide; CO = carbon monoxide; PM10 = particulate matter that is 10 microns in diameter and smaller; PM2.5 = particulate matter that is 2.5 microns in diameter and smaller; SO_2 = sulfur dioxide.

[a] The O&M building is no longer a part of the Project. Therefore, emissions presented in the daily total is conservative and will likely be lower than shown. However, the significance conclusions are not anticipated to change.

[b] Includes all construction activities except turbine delivery and installation, and restoration and cleanup, which would not occur during the period producing the maximum daily emissions.

Operation

Table 3.3-10 presents estimated emissions from operation of the Project. These emissions would be exclusively in the BAAQMD and would begin following completion of Project construction (i.e., the first operational year would be 2020). As shown in Table 3.3-10, operation emissions would not exceed BAAQMD's thresholds of significance. Accordingly, cumulative impacts during operation in the BAAQMD would be less than significant.

Table 3.3-10. Criteria Pollutants from Project Operation in BAAQMD (pounds per day)[a]

Activity	ROG	NO_X	CO	SO_2	PM10	PM2.5
Offsite worker trips	<1	<1	<1	<1	<1	<1
Maintenance/operation	2	21	13	<1	9	6
Total	2	21	14	<1	9	7
BAAQMD (2017) threshold	54	54	–	–	82	54
Significant Impact?	No	No	No	No	No	No

ROG = reactive organic gases; NO_X = nitrogen oxide; CO = carbon monoxide; PM10 = particulate matter that is 10 microns in diameter and smaller; PM2.5 = particulate matter that is 2.5 microns in diameter and smaller; SO_2 = sulfur dioxide.

[a] Wind energy generated by the Project would displace a comparable quantity of conventional grid energy. Power plants located throughout the state supply the grid with power; some of these generate criteria pollutants. Because these power plants are located throughout the state, criteria pollutant reductions achieved by the Project cannot be fully ascribed to the BAAQMD and are therefore not reported in the table.

PEIR Mitigation Measure AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures

The Project proponents will require all contractors to comply with the following requirements for all areas with active construction activities.

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) will be watered as needed to maintain dust control onsite—approximately two times per day.
- All haul trucks transporting soil, sand, or other loose material offsite will be covered.
- All visible mud or dirt track-out onto adjacent public roads will be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads will be limited to 15 mph.
- All roadways, driveways, and sidewalks to be paved will be completed as soon as possible. Building pads will be laid as soon as possible after grading unless seeding or soil binders are used.
- Idling times will be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage will be provided for construction workers at all access points.
- All construction equipment will be maintained and properly tuned in accordance with manufacturer's specifications. All equipment will be checked by a certified visible emissions evaluator.
- Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person will respond and take corrective action within 48 hours. The air district's phone number will also be visible to ensure compliance with applicable regulations.

PEIR Mitigation Measure AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures

The Project proponents will require all contractors to comply with the following requirements for all areas with active construction activities.

- During construction activities, all exposed surfaces will be watered at a frequency adequate to meet and maintain fugitive dust control requirements of all relevant air quality management entities.
- All excavation, grading, and/or demolition activities will be suspended when average wind speeds exceed 20 mph, as measured at the Livermore Municipal Airport.
- Wind breaks (e.g., trees, fences) will be installed on the windward side(s) of actively disturbed areas of construction. Wind breaks should have at maximum 50% air porosity.

- Vegetative ground cover (e.g., fast-germinating native grass seed) will be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established.
- If feasible and practicable, the simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time will be limited.
- Construction vehicles and machinery, including their tires, will be cleaned prior to leaving the construction area to remove vegetation and soil. Cleaning stations will be established at the perimeter of the construction area.
- Site accesses to a distance of 100 feet from the paved road will be treated with a 6 to 12 inch compacted layer of wood chips, mulch, or gravel.
- Sandbags or other erosion control measures will be installed to prevent silt runoff to public roadways from sites with a slope greater than 1%.
- The idling time of diesel powered construction equipment will be minimized to 2 minutes.
- The Project will develop a plan demonstrating that the offroad equipment (more than 50 horsepower) to be used in the construction project (i.e., owned, leased, and subcontractor vehicles) would achieve a Project wide fleet-average 20% NO_X reduction and 45% PM reduction compared to the most recent ARB fleet average. Acceptable options for reducing emissions include the use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, add-on devices such as particulate filters, and/or other options as such become available.
- Use low VOC (i.e., ROG) coatings beyond the local requirements (i.e., Regulation 8, Rule 3: Architectural Coatings).
- All construction equipment, diesel trucks, and generators will be equipped with BACT for emission reductions of NO_X and PM.
- All contractors will use equipment that meets ARB's most recent certification standard for offroad heavy duty diesel engines.

2019 NEW Mitigation Measure AQ-2c: Reduce construction-related air pollutant emissions to below BAAQMD NO_x thresholds

The Project proponents will ensure construction-related emissions do not exceed BAAQMD's construction NO_X threshold of 54 pounds per day. In addition to implementing PEIR Mitigation Measures AQ-2a and AQ-2b, the Project proponents will coordinate with BAAQMD (or other governmental entity) to purchase NO_X credits to offset remaining NO_X construction and operations emissions exceeding BAAQMD thresholds.

The Project proponents will track construction activity, estimate emissions, and enter into a construction mitigation contract with BAAQMD or other governmental entity to offset NO_X emissions that exceed BAAQMD NO_X maximum daily threshold of 54 pounds per day.

The maximum daily emissions will be calculated on a daily basis by determining total construction-related NO_X emissions for each calendar day. BAAQMD (or other government entity) will use the mitigation fees provided by the Project proponents to implement emissions reduction efforts that offset Project NO_X emissions that exceed the BAAQMD threshold.

This mitigation includes the following specific requirements:

- The Project proponents will require construction contractors to provide daily construction activity monitoring data for all construction activities associated with the Project to estimate actual construction emissions, including the effect of equipment emissions reduction measures. The Project proponents will submit the daily construction activity monitoring data and an estimate of actual daily construction emissions to the lead agency and BAAQMD (or other governmental entity) for review by the 15th day of each month for the prior construction month. The lead agency will examine the construction and operational activity monitoring to ensure it is representative, and BAAQMD (or other government entity) will examine the emissions estimate to ensure it is calculated properly.
- After acceptance of the emissions estimates by BAAQMD (or other governmental entity) for the prior month, the Project proponents will submit mitigation fees to BAAQMD (or other governmental entity) to fund offsets for the portion of daily emissions that exceed the maximum daily NO_X threshold. The mitigation fees will be based on the mitigation contract with BAAQMD (see discussion below) but will not exceed the emissions-reduction Project cost-effectiveness limit set for the Carl Moyer Program for the year in which mitigation fees are paid. The current Carl Moyer Program cost-effectiveness limit is $30,000 per weighted ton of criteria pollutants (NO_X + ROG + [20*PM]). An administrative fee of 5% will be paid by the Project proponents to BAAQMD (or other governmental entity) to implement the program.
- The mitigation fees will be used by BAAQMD (or other governmental entity) to fund projects that are eligible for funding under the Carl Moyer Program guidelines or other BAAQMD (or other governmental entity) emissions-reduction incentive programs that meet the Carl Moyer Program cost-effectiveness threshold and are real, surplus, quantifiable, and enforceable.
- The Project proponents will enter into a mitigation contract with BAAQMD (or other governmental entity) for the emissions-reduction incentive program. The mitigation contract will include the following:
    - Identification of appropriate offsite mitigation fees required for the Project.
    - Timing for submission of mitigation fees.
    - Processing of mitigation fees paid by the Project proponents.
    - Verification of emissions estimates submitted by the Project proponents.
    - Verification that offsite fees are applied to appropriate mitigation programs within the SFBAAB.

The mitigation fees will be submitted within 4 weeks of BAAQMD (or other governmental entity) acceptance of an emissions estimate provided by the Project proponents showing that the maximum daily NO_X threshold was exceeded (when measured on a daily basis).

Impact AQ-3: Exposure of sensitive receptors to substantial pollutant concentrations (less than significant with mitigation)

Several models and tools capable of translating mass emissions of criteria pollutants to various health endpoints have been developed. Three tools are identified as potential methods for correlating project-level emissions to material health consequences. EPA's Environmental Benefits Mapping and Analysis Program - Community Edition (BenMAP-CE) is designed to estimate health impacts from air pollution at the national, state, county, and city levels, and it has been applied at the sub-city level (1-square kilometer)(Kheirbek et. al 2014). BAAQMD's Multi-Pollutant Evaluation Method was designed to estimate health impacts from changes in regional emissions concentrations within the San Francisco Bay Area but could be used to analyze smaller, project-level contributions. The EPA's Sector-based Benefit-per-Ton estimates are "reduced form" tables from BenMAP-CE that were developed to reduce the burden of applying the full model. The estimates are based on national mortality, morbidity, and economic values but could be generally applied to individual projects for illustrative purposes. Although all three of these tools have potential application for CEQA analyses, they have specific limitations and may only be applied under certain project-specific circumstances. For instance, almost all tools were designed to be used at the national, state, regional, or city levels. These tools are not well suited to analyze small or localized changes in pollutant concentrations associated with individual projects. Accordingly, they are not recommended for the CEQA analysis of the proposed Project.

The Project is consistent with the *Alameda County General Plan* and does not conflict with BAAQMD's *Clean Air Plan* or SJVAPCD's air quality attainment plans, which contain public health goals and policies. For instance, the general plan includes policies to maximize the production of wind-generated energy, a clean energy source (Alameda County 2000). In addition, the air quality plans recognize that national and state ambient air quality standards are intended to prevent short-term (acute) health effects, address long-term (chronic) health effects, and improve public health (Bay Area Air Quality Management District 2017a; San Joaquin Valley Air Quality Management District 2016). Therefore, local thresholds, which are developed to meet NAAQS and CAAQS, also ensure that public health is protected.

The PEIR concluded that receptor exposure to DPM from construction of the repowering projects would be a less-than-significant impact with implementation of PEIR Mitigation Measures AQ-2a and AQ-2b, which would reduce both criteria pollutants and DPM emissions. Implementation of an additional measure, 2019 NEW Mitigation Measure AQ-2c, would further reduce criteria pollutant emissions.

Long-term operation of the proposed Project would not result in a significant new source of emissions. Offsite truck trips during construction would be transitory and would use multiple roads over a widespread area, thereby helping to disperse toxic pollutants and minimize exposure. Onsite construction activities would generate DPM, but these activities would occur over a relatively short period—approximately 1 year, far less than the exposure duration of 30 years that is typically associated with chronic cancer risk (Office of Environmental Health Hazard Assessment 2015). Emissions would also be spatially dispersed throughout the Project area and at multiple turbine locations.

A health risk assessment (HRA) was not prepared for the Project. Although HRAs for TACs are commonly prepared, some air districts (e.g., SJVAPCD) have stated:

> It is not feasible to conduct a similar analysis for criteria air pollutants because currently available computer modeling tools are not equipped for this task. [Similarly,] because of the complexity of secondary PM formation, the tonnage of PM-forming precursor emissions [sulfur oxides and NOx] in an area does not necessarily result in an equivalent concentration of secondary PM in that area" (San Joaquin Valley Air Pollution Control District 2015b).

Directly emitted PM also does not always equate to a specific localized impact because emissions can be transported and dispersed. Given the multitude of interconnected variables (e.g., local meteorology, atmospheric conditions) that influence the formation and transportation of pollution, models designed to evaluate future ozone and PM levels are based on regional or national conditions. Accordingly, emissions modeling of one project is not likely to yield valid information, (San Joaquin County Air Pollution Control District 2015b). Given the scale of the proposed Project, emissions are not anticipated to contribute to a material ozone or health effect in the Project area or during equipment and material hauling from Stockton and Tracy to the Project area, as the areas are already listed as nonattainment for ozone.

While exposure to DPM emissions would be of short duration, two receptors are within 1,000 feet of turbine work areas. These receptors may be exposed to increased health risks during construction at these individual locations. Accordingly, this impact is conservatively concluded to be potentially significant. Implementation of PEIR Mitigation Measures AQ-2a and AQ-2b would reduce DPM emissions and associated health risks of sensitive receptors. Implementation of an additional measure, 2019 NEW Mitigation Measure AQ-2c, would further reduce criteria pollutant emissions. This impact would be less than significant with mitigation.

PEIR Mitigation Measure AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures

PEIR Mitigation Measure AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation Measures

2019 NEW Mitigation Measure AQ-2c: Reduce construction-related air pollutant emissions to below BAAQMD NO_x thresholds

Impact AQ-4: Generation of objectionable odors adversely affecting a substantial number of people (less than significant)

The PEIR concluded that neither construction nor operation of the repowering projects would result in significant odor impacts. Odor emissions of the proposed Project would be similar to those evaluated at the program level (PEIR Impact AQ-5); they would be primarily limited to the construction period. Sources of odors during construction would be diesel-powered trucks and vehicles. Potential odors from these sources would be temporary (1 year) and spatially dispersed over the Project area. Accordingly, the proposed Project is not anticipated to create objectionable odors that would violate air district nuisance rules. This impact would be less than significant, and no mitigation is required.

3.3.3 References Cited

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3.4 Biological Resources

The PEIR evaluated the potential for impacts on biological resources. Because the characteristics of the Project area and the activities associated with Project construction and operation are the same as those contemplated in the PEIR, existing biological conditions in the Project area are generally the same as those analyzed in the PEIR. This section examines the results of recent biological resource surveys and special-status species habitat assessments to determine if conditions have significantly changed since certification of the PEIR, assesses the potential effects associated with constructing and operating the Project, and identifies mitigation measures, including mitigation measures consistent with the PEIR that would reduce potentially significant impacts.

3.4.1 Existing Conditions

Regulatory Setting

This section provides an overview of the major laws and regulations that pertain to biological resources in the Project area.

Federal Endangered Species Act

The U.S. Fish and Wildlife Service (USFWS) has jurisdiction over species listed as threatened or endangered under Section 9 of the federal Endangered Species Act (ESA). ESA protects listed species from take, which is broadly defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." For any project involving a federal agency (e.g., U.S. Army Corps of Engineers) in which a listed species could be affected, the federal agency must consult with USFWS in accordance with Section 7 of the ESA. USFWS issues a biological opinion and, if the project does not jeopardize the continued existence of the listed species, issues an incidental take permit. When no federal context is present, proponents of a project affecting a listed species may consult with the USFWS and apply for an incidental take permit under Section 10 of the ESA. Section 10 requires an applicant to submit a conservation plan that specifies project impacts and mitigation measures.

Bald and Golden Eagle Protection Act

The Eagle Act (16 United States Code [USC] 668), signed into law in 1940 and expanded in 1962 to include golden eagle, prohibits take and disturbance of individuals and nests. Take under the Eagle Act includes any actions to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, and disturb eagles. Disturb is further defined in 50 Code of Federal Regulations (CFR) Part 22.3 as:

> to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.

Prior to 2009, permits for purposeful take of birds or body parts were limited to scientific (50 CFR 22.21), religious (50 CFR 22.22), or falconry (50 CFR 22.24) pursuits; eagles causing serious injury to livestock or other wildlife (50 CFR 22.23); and golden eagle nests that interfere with resource development or recovery operations (50 CFR 22.21–25). In 2009, USFWS issued the 2009 Final Rule on new permit regulations that allows take "for the protection of…other interests in any particular locality" and where the take is "associated with and not the purpose of an otherwise lawful activity…" (74 Federal Register [FR] 46836–46879). The 2009 Final Rule authorized programmatic take (take that is recurring and not in a specific, identifiable timeframe or location) of eagles only if avoidance measures have been implemented to the maximum extent achievable such that take was no longer avoidable.

In 2016, USFWS issued revisions to the Final Rule pertaining to incidental take and take of eagle nests. The Final Rule changed the programmatic take standard to a new standard authorizing "incidental take" if all "practicable" measures to reduce impacts on eagles are implemented. An eagle incidental take permit under the 2016 Revisions to the Final Rule (50 CFR 22) is available for activities that may disturb or otherwise take eagles on an ongoing basis, such as operational activities. The eagle incidental take permit under the 2009 Final Rule was valid up to 5 years. In 2012, USFWS proposed to extend the maximum term for eagle incidental take permits from 5 to 30 years (77 FR 22267–22278). In 2013, USFWS issued a Final Rule to extend the maximum term for eagle incidental take permits to 30 years, subject to a recurring 5-year review process throughout the life of the permit. Although this rule was challenged in 2015, the final regulations under the 2016 Revisions to the Final Rule also include a maximum permit term of 30 years, subject to a recurring 5-year review process throughout the life of the permit (81 FR 91494–91554).

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 USC 703–712) enacts the provisions of treaties between the United States, Great Britain, Mexico, Japan, and the Soviet Union and authorizes the U.S. Secretary of the Interior to protect and regulate the taking of migratory birds. It protects migratory birds, their occupied nests, and their eggs (16 USC 703; 50 CFR 21; 50 CFR 10). Most actions that result in take—defined as hunting, pursuing, wounding, killing, possessing, or transporting any migratory bird, nest, egg, or part thereof—are prohibited under the MBTA. Examples of permitted actions that do not violate the MBTA are the possession of a hunting license to pursue specific gamebirds, legitimate research activities, display in zoological gardens, bird-banding, and other similar activities. USFWS is responsible for overseeing compliance with the MBTA.

On December 22, 2017, the U.S. Department of Interior Office of the Solicitor issued a memorandum: M-37050—The Migratory Bird Treaty Act Does Not Prohibit Incidental Take (M Opinion). The M Opinion withdrew and replaced Solicitor's Opinion M-37041—Incidental Take Prohibited Under the Migratory Bird Treaty Act, issued January 10, 2017. The M Opinion concludes that "the MBTA's prohibitions on pursuing, hunting, taking, capturing, killing, or attempting to do the same only criminalize affirmative actions that have as their purpose the taking or killing of migratory birds, their nests, or their eggs." USFWS issued guidance on the M Opinion on April 11, 2018, to clarify what constitutes prohibited take and what actions must be taken when conducting lawful intentional take. The guidance interprets the M Opinion to mean that the MBTA's prohibitions on take apply when the purpose of an action is to take migratory birds, their eggs, or their nests. The take of birds, eggs, or nests that results from an activity, the purpose of which is not to take birds, eggs, or nests, is not prohibited by the MBTA.

California Endangered Species Act

The California Endangered Species Act (CESA) prohibits the take of endangered and threatened species; however, habitat destruction is not included in the state's definition of *take*. Section 2090 of CESA requires state agencies to comply with endangered species protection and recovery and to promote conservation of these species. The California Department of Fish and Wildlife (CDFW) administers CESA and authorizes take through Section 2081 agreements.

California Fish and Game Code

Fully Protected Species

The California Fish and Game Code provides protection from take for a variety of species, referred to as *fully protected species*. Section 5050 lists fully protected amphibians and reptiles, Section 3515 lists fully protected fish, Section 3511 lists fully protected birds, and Section 4700 lists fully protected mammals. The California Fish and Game Code defines *take* as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Except for take related to scientific research or authorized pursuant to an approved natural community conservation plan, all take of fully protected species is prohibited.

Sections 3503 and 3503.5

Section 3503 of the California Fish and Game Code prohibits the killing of birds and the destruction of bird nests. Section 3503.5 prohibits the killing of raptor species and the destruction of raptor nests.

Section 1600: Streambed Alteration Agreements

In addition to regulating listed and special-status species, CDFW regulates activities that would interfere with the natural flow—or substantially alter the channel, bed, or bank—of a lake, river, or stream. These activities are regulated under California Fish and Game Code Sections 1600–1616 and require a streambed alteration agreement if they would substantially adversely affect an existing fish or wildlife resource. Requirements to protect the integrity of biological resources and water quality are often conditions of streambed alteration agreements. CDFW may require avoidance or minimization of vegetation removal, use of standard erosion control measures, limitations on the use of heavy equipment, limitations on work periods to avoid impacts on fish and wildlife, and restoration of degraded sites or compensation for permanent habitat losses, among other conditions. Aquatic resources (i.e., drainage features and ponds) are present in the Project area and a streambed alternation agreement may be required if the Project would affect wildlife habitat associated with these resources.

Clean Water Act

The Clean Water Act (CWA) was passed by Congress in 1972 with a broad mandate "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The chief purpose of the CWA is to establish the basic structure for regulating discharges of pollutants into waters of the United States. The CWA authorizes the U.S. Environmental Protection Agency (EPA) to set national water quality standards and effluent limitations, and includes programs addressing both point-source and nonpoint-source pollution. Point-source pollution is pollution that originates or enters surface waters at a single, discrete location, such as an outfall structure or an excavation or construction site. Nonpoint-source pollution originates over a broader area and includes urban contaminants in stormwater runoff and sediment loading from upstream areas. The CWA operates on the principle that all discharges into the nation's waters are unlawful unless specifically authorized by a permit; permit review is the CWA's primary regulatory tool. Aquatic resources (i.e., drainage features and wetlands) are present in the Project area and may be regulated under CWA Section 404.

Section 402: Permits for Stormwater Discharge

CWA Section 402 regulates construction-related stormwater discharges to surface waters through the National Pollutant Discharge Elimination System (NPDES) program, administered by EPA. In California, the State Water Resources Control Board (State Water Board) is authorized by EPA to oversee the NPDES program through the Regional Water Quality Control Boards (Regional Water Boards).

NPDES permits are required for projects that disturb more than 1 acre of land. The NPDES permitting process requires the applicant to file a public notice of intent to discharge stormwater and to prepare and implement a stormwater pollution prevention plan (SWPPP). The SWPPP must include a site map, a description of proposed construction activities, and the best management practices (BMPs) that will be implemented to prevent soil erosion and discharge of other construction-related pollutants (e.g., petroleum products, solvents, paints, cement) that could contaminate nearby water resources. Permittees are required to conduct annual monitoring and reporting to ensure that BMPs are correctly implemented and effective in controlling the discharge of stormwater-related pollutants. Because the Project would disturb more than 1 acre of land, the applicant would prepare a SWPPP and apply for an NPDES permit.

Section 404: Permits for Placement of Fill in Waters of the United States (Including Wetlands)

Waters of the United States (including wetlands) are protected under Section 404 of the CWA. Any activity that involves a discharge of dredged or fill material into waters of the United States, including wetlands, is subject to regulation by the U.S. Army Corps of Engineers (USACE). *Waters of the United States* is defined to encompass navigable waters of the United States; interstate waters; all other waters where their use, degradation, or destruction could affect interstate or foreign commerce; tributaries of any of these waters; and wetlands that meet any of these criteria or are adjacent to any of these waters or their tributaries. *Wetlands* are defined under Section 404 as those areas that are inundated or saturated by surface water or groundwater 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. Jurisdictional wetlands must meet three wetland delineation criteria.

- They support hydrophytic vegetation (i.e., plants that grow in saturated soil).
- They have hydric soil types (i.e., soils that are wet or moist enough to develop anaerobic conditions).
- They have wetland hydrology.

Section 401: Water Quality Certification

Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must apply for water quality certification from the state. Therefore, all projects with a federal component that may affect the quality of waters of the state (including projects that require federal approval, such as a CWA Section 404 permit) must comply with CWA Section 401.

In California, CWA Section 401 is administered by the State Water Board through the Regional Water Boards. All areas qualifying as waters of the United States under CWA Section 404 also qualify as waters of the State of California (waters of the state) under the jurisdiction of CWA Section 401 and the State Water Board and Regional Water Boards; however, some areas considered as waters of the state do not qualify as waters of the United States. State Water Board jurisdiction at streams, lakes, and ponds considered as waters of the United States extends beyond the ordinary high water mark to the top of bank or to the greatest lateral extent of riparian vegetation, whichever is greater. Isolated wetlands, nonnavigable waters, and intrastate waters may also qualify as waters of the state subject to State Water Board jurisdiction under CWA Section 401.

As currently designed, the proposed Project is expected to result in a discharge of pollutants into waters of the United States; accordingly, a CWA Section 401 water quality certification from the Regional Water Board will be required. All riparian areas associated with streams in the Project area also qualify as jurisdictional wetlands and are mapped and described in the delineation of aquatic resources. All features in the Project area are both waters of the state and waters of the United States.

Executive Order 11312: Invasive Species

Executive Order 11312 (February 3, 1999) directs all federal agencies to prevent and control the introduction and spread of invasive nonnative species in a cost-effective and environmentally sound manner to minimize their effects on economic, ecological, and human health. The executive order was intended to build upon existing laws, such as the National Environmental Policy Act, the Nonindigenous Aquatic Nuisance Prevention and Control Act, the Lacey Act, the Plant Pest Act, the Federal Noxious Weed Act, and ESA. The executive order established a national Invasive Species Council composed of federal agencies and departments, as well as a supporting Invasive Species Advisory Committee composed of state, local, and private entities. The council and advisory committee oversee and facilitate implementation of the executive order, including preparation of the National Invasive Species Management Plan. The Project may introduce invasive species and, thus, federal agencies would be required to consider this executive order prior to issuing permits.

Land-Based Wind Energy Guidelines

The voluntary *Land-Based Wind Energy Guidelines* (Wind Energy Guidelines) were developed by USFWS (2012) in collaboration with the Wind Turbine Guidelines Advisory Committee to replace interim voluntary guidance prepared in 2003. The Wind Energy Guidelines discuss various risks to species of concern from wind energy projects and provide guidance for assessing potential adverse effects on species of concern and their habitats using a tiered approach. Species of concern include migratory birds; bats; bald and golden eagles and other birds of prey; prairie and sage grouse; and listed, proposed, or candidate species. During the preconstruction tiers (Tiers 1, 2, and 3), developers work to identify, avoid, and minimize risks to species of concern. During postconstruction tiers (Tiers 4 and 5), developers assess whether actions taken in earlier tiers to avoid and minimize impacts are successfully achieving the goals and, when necessary, take additional steps to compensate for impacts. Each tier builds upon the previous tier(s) by refining and building upon issues previously raised and efforts undertaken. The stages of the Wind Energy Guidelines follow these tiers closely.

- Tier 1—Preliminary site evaluation (landscape-scale screening of possible project sites).
- Tier 2—Site characterization (broad characterization of one or more potential project sites).
- Tier 3—Field studies to document site-specific wildlife and habitat and predict project impacts.
- Tier 4—Postconstruction studies to estimate impacts.
- Tier 5—Other postconstruction studies and research.

The tiered approach allows developers to evaluate and make decisions at each stage. Developers can either abandon or proceed with project development, or they can collect additional information if required. If sufficient data are available for a specific tier, the following outcomes are possible.

- The project proceeds to the next tier in the development process without additional data collection.
- The project proceeds to the next tier in the development process with additional data collection.
- An action or combination of actions, such as project modification, mitigation, or specific postconstruction monitoring, is indicated.
- The project site is abandoned because the risk is considered unacceptable.

If sufficient data are not available for any tier, more intensive study is conducted in the subsequent tier until sufficient data are available to make a decision to modify the project, proceed with the project, or abandon the project. Following the Wind Energy Guidelines is voluntary, but USFWS will consider a developer's adherence to the Wind Energy Guidelines if a violation occurs.

Environmental Setting

The approximately 2,700-acre Project area is located within the Altamont Pass Wind Resource Area (APWRA), an approximately 50,000-acre area that extends across the northeastern hills of Alameda County and a smaller portion of Contra Costa County to the north. The Project region is generally characterized by mostly treeless rolling foothills of annual grassland. The dominant land uses are wind energy generation, agriculture, and cattle grazing. Major anthropogenic features of the region are the wind turbines and ancillary facilities, an extensive grid of high-voltage power transmission lines, substations, microwave towers, a landfill site, Interstate 580, railroad lines, ranch houses, clusters of rural residential homes on Dyer and Midway Roads, Bethany Reservoir, and the South Bay Pumping Plant.

Much of the Project area is occupied by a previously operating wind farm within a rural, unincorporated portion of northeastern Alameda County. Most of the Project area is also grazed by cattle. The region is mostly shrubless and treeless and is generally characterized by rolling foothills of annual grassland that are steeper on the west and gradually flatter toward the east where the terrain slopes toward the floor of the Central Valley. Elevations range from approximately 600 to 1,200 feet above sea level. The Project area is within Conservation Zone 6 of the *East Alameda Conservation Strategy* (EACCS).

In addition to the PEIR, the following documents and resource databases were reviewed to provide background information on biological resources in the Project area and vicinity:

Terrestrial Species References

- The California Natural Diversity Database (CNDDB) for the Clifton Court Forebay, Midway, and surrounding U.S. Geological Survey 7.5-minute quadrangles (California Department of Fish and Wildlife 2019).
- California Native Plant Society's Inventory of Rare and Endangered Plants for the Clifton Court Forebay, Midway, and surrounding U.S. Geological Survey 7.5-minute quadrangles (California Native Plant Society 2019).
- The Information for Planning and Consultation Trust Resource Report species list for the Project area (U.S. Fish and Wildlife Service 2019).
- *Biological Resources Evaluation for the Sand Hill Wind Repowering Project* (ICF 2018a).
- *Sand Hill Wind Repowering Project Supplemental Aquatic Resources Delineation Report* (ICF 2018b).
- Botanical surveys conducted in portions of the Project area for earlier repowering efforts (ICF International 2013a; Alphabiota Environmental Consulting 2013).
- *California Tiger Salamander and California Red-legged Frog Habitat Site Assessment for the Sand Hill Wind Project, Alameda County*, which was conducted in portions of the Project area for earlier repowering efforts (ICF International 2012).
- *East Alameda Conservation Strategy* (ICF International 2010).

Avian and Bat Fatalities References

- *Golden Hills Wind Energy Center Postconstruction Fatality Monitoring Report: Year 1* (H. T. Harvey & Associates. 2018a).
- *Golden Hills Wind Energy Center Postconstruction Fatality Monitoring Report: Year 2* (H. T. Harvey & Associates. 2018b).
- *Addendum to Comparison of Wind Turbine Collision Hazard Model Performance: One-year Post-construction Assessment of Golden Eagle Fatalities at Golden Hills* (Smallwood 2018).
- *Comparison of Wind Turbine Collision Hazard Model Performance Prepared for Repowering Projects in the Altamont Pass Wind Resource Area* (Smallwood and Neher 2017).
- *Distribution, nesting activities, and age-class of territorial pairs of golden eagles at the Altamont Pass Wind Resource Area, California, 2014-2016* (Kolar and Wiens 2017).
- *Spatial Demographic Models to Inform Conservation Planning of Golden Eagles in Renewable Energy Landscapes* (Wiens et. al. 2017).
- *Vasco Avian and Bat Monitoring Project 2012–2015 Final Report* (Brown et. al. 2016).
- *Final Report Altamont Pass Wind Resource Area Bird Fatality Study. Monitoring Years 2005-2013* (ICF International 2016).
- *Bald and Golden Eagles: Population demographics and estimation of sustainable take in the United States, 2016 update* (U.S. Fish and Wildlife Service 2016).

- *Comparing Bird and Bat Use Data for Siting New Wind Power Generation* (Smallwood and Neher 2016a).
- *Siting Wind Turbines to Minimize Raptor Collisions at Sand Hill Repowering Project, Altamont Pass Wind Resource Area* (Smallwood and Neher 2016b).
- *Siting Wind Turbines to Minimize Raptor Collisions at Summit Winds Repowering Project, Altamont Pass Wind Resource Area* (Smallwood and Neher 2016c).
- *Bird and Bat Impacts and Behaviors at Old Wind Turbines at Forebay, Altamont Pass Wind Resource Area* (Smallwood and Neher 2016d).
- *Siting Wind Turbines to Minimize Raptor Collisions at the Patterson Pass Repowering Project, Altamont Pass Wind Resource Area* (Smallwood and Neher 2015a).
- *Siting Wind Turbines to Minimize Raptor Collisions at Golden Hills North Repowering Project, Altamont Pass Wind Resource Area* (Smallwood and Neher 2015b).
- *Siting Wind Turbines to Minimize Raptor Collisions at Golden Hills North Repowering Project, Altamont Pass Wind Resource Area* (Smallwood and Neher 2015c).
- *Estimation of occupancy, breeding success, and predicted abundance of Golden Eagles (Aquila chrysaetos) in the Diablo Range, California, 2014* (Wiens et. al. 2015).
- *Siting wind turbines to minimize raptor collisions at Sand Hill Repowering Project, Altamont Pass Wind Resource Area* (Smallwood and Neher 2018).
- *Assessment of proposed wind turbine sites to minimize raptor collisions at the Sand Hill Wind Repowering Project in the Altamont Pass Wind Resource Area* (Estep 2019).
- *GPS Satellite Tracking of Golden Eagles (Aquila chrysaetos) in the Altamont Pass Wind Resource Area (APWRA) and the Diablo Range: Final Report for Phases 1 and 2 of the NextEra Energy Settlement Agreement* (Bell 2017).
- *Siting Wind Turbines to Minimize Raptor Collisions at Sand Hill Repowering Project, Altamont Pass Wind Resource Area* (Smallwood and Neher 2016b).
- *Vasco Avian and Bat Monitoring Project 2012–2013 Annual Report* (Brown et. al. 2013).
- *Siting Wind Turbines to Minimize Raptor Collisions at Tres Vaqueros Repowering Project* (Smallwood and Neher 2011).
- *Siting Wind Turbines to Minimize Raptor Collisions at Tres Vaqueros Repowering Project* (Smallwood and Neher 2010a).
- *Siting Wind Turbines to Minimize Raptor Collisions at Vasco Winds* (Smallwood and Neher 2010b).
- *Map-based repowering of the Altamont Pass Wind Resource Area based on burrowing owl burrows, raptor flights, and collisions with wind turbines* (Smallwood and Neher 2009).
- *2008/2009 Annual Report for the Buena Vista Avian and Bat Monitoring Project* (Insignia Environmental 2009).
- *Impacts to wildlife of wind energy siting and operation in the United States* (Allison et al. 2019)
- *Evidence of region-wide bat population decline from long-term monitoring and Bayesian occupancy models with empirically informed priors* (Rodhouse et al. 2019).

- *Relating bat and bird passage rates to wind turbine collision fatalities* (Smallwood and Bell 2019).
- *Skilled dog detections of bat and small bird carcasses in wind turbine fatality monitoring* (Smallwood et al. 2019).
- *Golden eagle population monitoring in the vicinity of the Altamont Pass Wind Resource Area, California, 2014-2018* (Wiens and Kolar 2019).

New Information Obtained since Certification of the PEIR

Avian and Bat Behavioral Studies

Wiens and Kolar (2019) and USFWS (2019) present detailed information about golden eagle demographics in the Diablo Range and the differences in life history attributes between birds typical of the APWRA and birds elsewhere in the Diablo Range, showing that breeding pairs in the APWRA are more likely to have a subadult member, and that this supports the hypothesis that the APWRA is a net sink for golden eagles, where annual reproduction (successful fledging of chicks) is far outweighed by annual mortality, which is almost all associated with wind turbines.

Additional Fatality Monitoring Studies

The PEIR considered fatality monitoring results from three projects: Diablo Winds, Buena Vista, and Vasco Wind. Since the PEIR was prepared in 2014, an additional 2 years of monitoring for birds and bats at Vasco Wind were completed. The results were reported in Brown et al. (2016) and are incorporated into this analysis. Additionally, the Golden Hills project was constructed and 2 years of avian and bat monitoring have been completed.

In early 2018, H. T. Harvey & Associates prepared the *Golden Hills Wind Energy Center Postconstruction Fatality Monitoring Report: Year 1*, presenting the results of the first year's monitoring effort and analysis of those results (H. T. Harvey & Associates 2018a). The monitoring effort indicated potentially higher mortality rates than those estimated in the PEIR, particularly for golden eagles and red-tailed hawks. The PEIR analyzed effects on avian and bat species using information on multiple repowered projects collected over multiple years, noting that "… fatality rates in the APWRA are highly variable (that is because they differ across years, turbine types, geographies, and topographies…)."

The first year of Golden Hills data (H. T. Harvey & Associates 2018a) reflected monitoring during northern California's wettest year on record, using search methods (e.g., search dogs and shorter, 7-day search intervals) that were not used for most of the baseline (and repower) mortality estimates presented in the PEIR. The monitoring duration during unusually high rainfall conditions and the use of different search methods make comparison with the PEIR's baseline data difficult (H. T. Harvey & Associates 2018a:51). Results for the second year of monitoring at Golden Hills were mixed. Some substantial reductions of the mortality rate for some species were observed (e.g., red-tailed hawk), while the mortality rate for some species increased, sometimes inexplicably (e.g., burrowing owl).

The Golden Hills estimated mortality rate (averaged over the 2 years of monitoring) for all raptors combined (the primary criterion for APWRA avian impact measurement) was significantly lower than the pre-repowering average from the APWRA-wide avian monitoring study (which already reflected significant mortality reductions resulting from seasonal shutdown and the removal of high-risk turbines in accordance with the 2007 settlement agreement) (H. T. Harvey & Associates

2018b). APWRA-wide nonrepowered average mortality rates for all raptors combined was 2.43/MW/year. The all-raptors combined average mortality rate for Golden Hills in its first 2 years of operation was 1.74/MW/year, 28% less than the average pre-repowered APWRA-wide rate—even though the latter included seasonal shutdowns and high-risk turbine removals.

The primary estimation model used in the first year H. T. Harvey report estimated higher golden eagle mortality rates (0.13/MW/year) than baseline, nonrepowered conditions (H. T. Harvey & Associates 2018a:50). However, the authors explained that the model "inflate[d] the estimate by incorporating searcher efficiency and carcass persistence parameters that represent medium/large birds as a group rather than eagles specifically" (i.e., the use of medium bird persistence parameters introduced an assumption that more golden eagle carcasses were missed during searches than was in fact the case because the large size of golden eagles makes them hard to miss). Other models used in the first-year H. T. Harvey report that did not incorporate these parameters yielded results that, in the words of the study, were "closer to reality." Those models estimated golden eagle mortality rates nearly matching (0.09/MW/year) or slightly below (0.07/MW/year) baseline conditions (0.08/MW/year) (H. T. Harvey & Associates 2018a:50). These rates are still higher than the rates of the three repowered projects used to generate estimates in the PEIR. The report observed that all of its golden eagle mortality rates may be overstated as a consequence of bias attributable to the presence of old turbines near the Golden Hills site that provided perching and nesting opportunities for raptors, including golden eagles, which were seen perching on them on several occasions (H. T. Harvey & Associates 2018a:46, 50). By the second year, the primary mortality model used was consistent with the method used in the final Vasco Winds monitoring report. The second-year golden eagle mortality rates were reported as being slightly higher than the first-year rates (0.17/MW/year) (H. T. Harvey & Associates 2018b:xiii). The authors further noted that "Higher fatality rates in this study compared to other APWRA repowering studies may partly reflect the influence of differing estimation methods, but probably reflect substantial inter-annual variation in climate and landscape conditions and the attendant influence on wildlife populations, as well as the consequences of evaluating project impacts based on short-term studies that may inadvertently represent atypical conditions." (H. T. Harvey & Associates 2018b:xii). In general, the authors of the second-year Golden Hills report noted that the primary conclusions from the first 2 monitoring years were that the golden eagle mortality rate was higher during both years compared to other recent APWRA studies. Additionally, they further noted that climactic conditions (a return to wetter conditions) may have contributed to the increase in golden eagle fatalities in year 2 (H. T. Harvey & Associates 2018b:63). As additional evidence of this interannual variability, the authors point to annual reproductive monitoring of golden eagles across central California, which they note dropped markedly during the 4-year drought, began to resurge in 2016, declined again during the very wet 2017 breeding season, and then surged again in 2018 (H. T. Harvey & Associates 2018b:63).

For the purposes of this analysis, estimates of golden eagle fatalities were calculated in two ways. The first way considered the estimates from year one, referred to by H. T. Harvey (2018a) as "closer to reality." The second way considered the alternative (and higher) estimates derived from the Huso DS729 estimation method.

Red-tailed hawk mortality rates observed in the first-year H. T. Harvey study also exceeded both the rates of the three repowering projects used to generate the PEIR's estimates for Golden Hills and the APWRA-wide estimates, but the H. T. Harvey report observed that additional years of study would be needed to determine whether this was an anomaly or a standard pattern (H. T. Harvey & Associates 2018a:50). As stated in the first-year H. T. Harvey report, red-tailed hawk results may also have been skewed by perching and nesting opportunities created by nearby old turbines, the removal of which would likely reduce mortality rates. The red-tailed hawk mortality rate dropped by approximately 41% in the second year of the Golden Hills study—from 0.91/MW/year to 0.37 /MW/year, nearly in line with the pre-repowering PEIR rate of 0.44/MW/year. The other raptor species analyzed in the H. T. Harvey reports, American kestrel and burrowing owl, revealed significantly lower averaged mortality rates than were estimated in the PEIR (H. T. Harvey & Associates 2018a, 2018b). The recently available information also indicates fatalities of tricolored blackbird and white-tailed kite are possible, as they have been observed at Vasco Wind and Golden Hills (although in very low numbers—one tricolored blackbird individual found during monitoring at each project and two white-tailed kites at Golden Hills).

With regard to bats, it is worth noting that the first-year monitoring report for the Vasco Winds project (Brown et al. 2013~~), erroneously reported overall bat mortality rates. Table 10 in Brown et al. (2013) reported adjusted mortality rates for bats in several ways, including using "national means" or "national averages" and several onsite trials with different size classes. As reported in that first-year monitoring report, the highest mortality rate was reported as 1.679 bats/MW/year considering the overall detection, otherwise known as the "big D" adjustment method. The PEIR used this mortality rate and an additional mortality rate from a nearby wind resource area to calculate the range of estimated bat fatalities for the Program alternatives and the specific projects. By the time the final report was prepared addressing all 3 monitoring years (Brown et al. 2016), a mortality rate of 1.679 bats/MW/year was reported in Table 30 for year one considering national averages. However, the average mortality rate for 3 years using the "D" adjustment was actually 3.207 bats/MW/year. Consequently, the estimates of bat fatalities described in the PEIR used the incorrect mortality rates for the estimates. For this analysis, the corrected mortality rates from the final Vasco Winds report were used (a 3-year average of 3.207 bats/MW/year).~~) used a slightly different methodology to calculate bat fatalities than was used in their final monitoring report (Brown et al 2016); the former estimates were used in the PEIR, and the latter in this analysis. The recent monitoring reports for Golden Hills (H. T. Harvey & Associates 2018a, 2018b) provide additional information regarding bat mortality rates following repowering. The monitoring results documented the majority of fatalities as Mexican free-tailed bats and hoary bats; however, several other species were affected to a much lesser degree. It is also worth noting that the Golden Hills fatality monitoring results for the first 2 years represent the first use of scent-detection dogs for an extended period to conduct fatality searches in the APWRA (H. T. Harvey & Associates 2018a:xii; Smallwood et al. 2018[1]). The authors of the studies note that the use of scent detection dogs, as well as shorter search intervals, "clearly resulted in our detecting far greater numbers of bat fatalities than previously reported in the APWRA; however, similar estimates of per MW fatality rates in this study and the post-repowering Vasco Winds study suggest that repowering with larger, taller turbines also may have contributed to a higher fatality rate for bats" (H. T. Harvey & Associates 2018a:xiii). Additional discussion of potential biases resulting from comparisons of this and other studies are presented later in this analysis.

Micrositing Studies

The PEIR outlined a mitigation strategy that, among other measures, recognized the potential benefits of careful micrositing of turbines in minimizing effects on avian species. Since preparation of the PEIR, this mitigation strategy has been initiated for several proposed projects in the APWRA. Several studies, undertaken both before and after issuance of the PEIR, used a generally similar

[1] Smallwood et al. 2018 conducted surveys using detection dogs at the Golden Hills and Buena Vista sites for a limited period (compared to the overall Golden Hills study described in H. T. Harvey & Associates 2018a, 2018b).

approach involving map-based collision hazard models to site turbines (Smallwood and Neher 2009, 2016a, 2017). However, many of these projects were never constructed. Additional studies, such as Bell (2017), which tracked golden eagles using satellite telemetry, have also supported map-based collision hazard models. Smallwood and Neher (2010a, 2010b, 2011) used micrositing analysis for the Vasco Winds and Tres Vaqueros projects in Contra Costa County; however, because the Tres Vaqueros project was never constructed, no results are available for interpretation. Smallwood and Neher (2015a) later conducted micrositing for the proposed Patterson Pass Repowering Project. Patterson Pass was authorized by the County with completion of the PEIR in 2014, but has not yet been constructed. Additionally, Smallwood and Neher (2016b) conducted micrositing at the Sand Hill repowering project (a project that had the same name in 2016 but is different from the currently proposed Project and under different ownership); this project was also never constructed. Finally, Smallwood and Neher (2016c) completed micrositing studies for the Summit Winds project, but like Tres Vaqueros, Patterson Pass, and the original Sand Hill project, Summit Winds has not yet been constructed. Smallwood and Neher (2015b, 2015c) conducted a micrositing study for the Golden Hills Repowering Project (following publication of the PEIR) for which fatality monitoring results are available. In summary, of multiple micrositing studies undertaken in the APWRA, only two—Vasco Winds and Golden Hills—have been associated with projects that were subsequently completed and for which monitoring results are available.

The Golden Hills study used collision hazard models to site turbines, as did the other studies, with the intent of minimizing avian collision risk. The Golden Hills project was subsequently built, beginning operation in December 2015, and the first- and second-year monitoring results have been published (H. T. Harvey & Associates 2018a, 2018b). Smallwood and Neher (2017) and Smallwood (2018) reviewed a draft and final of the first-year monitoring results and prepared a report and addendum, discussing the effectiveness of the micrositing effort and whether the collision hazard models used to guide micrositing were effective. The report states that the collision hazard models have improved over time, and that continued adjustments may improve the model performance. The report also highlighted that prioritizing fatality minimization for one species—golden eagle, for example—can result in putting other species at greater collision risk. Additionally, the addendum to the 2017 report stated that "the collision hazard models were likely effective at minimizing golden eagle fatalities in the absence of grading …" and noted that "… grading for wind turbine pads and access roads was extensive." Thus, Smallwood (2018) effectively cited topographic changes due to new access road and turbine pad construction as a potential cause for an increase in golden eagle mortality at Golden Hills. However, the extent to which these factors actually influence potential mortality remains speculative.

Smallwood and Neher (2017) noted that "Map-based collision hazard models of each successive repowering project benefitted from lessons learned from past efforts on repowering projects …" Although a number of micrositing studies have been prepared, definitive conclusions regarding the effectiveness of micrositing efforts are limited by the small sample size of projects completed for which fatality monitoring results are available (only Vasco Winds and Golden Hills have fatality monitoring results available). However, in general, the approach among all repowered projects, regardless of whether they were constructed, has been similar. Overall, the micrositing approach—and the studies completed to date—are consistent with and support the approach used in the PEIR (Mitigation Measure BIO-11b) that requires micrositing for each subsequent project to "… use the results of previous siting efforts to inform the analysis and siting methods as appropriate such that the science of siting continues to be advanced." Recent results and new information, such as the influence that grading may have on micrositing, may be useful in subsequent micrositing efforts and will be addressed in future studies consistent with the direction of the PEIR. Moreover, site-specific information for the Sand Hills Project area collected by Smallwood and Neher (2016d) will provide information useful for micrositing efforts. Although the efficacy and benefits of micrositing currently remains speculative, each successive project and its micrositing program is anticipated to benefit the next one until repowering of the APWRA as defined in the PEIR is complete.

Additional Studies on Golden Eagle

Since preparation of the PEIR, USFWS proposed and finalized a rule revising the regulations for permits for incidental take of eagles and eagle nests. In support of that process, USFWS prepared a report summarizing the status, trends, and sustainable take rates in the United States for bald and golden eagles (U.S. Fish and Wildlife Service 2016). In Bird Conservation Region (BCR) 32, a region covering most of California and that includes the APWRA, the median golden eagle population was estimated to be 718 individuals, a reduction from previous estimates (U.S. Fish and Wildlife Service 2016). However, prior studies of golden eagles in and near the APWRA have not addressed BCR 32, but instead have focused on the Diablo Range. The rationale for this is explained by Wiens et al. (2015), who note that “[t]racking data indicated that many individuals captured near the [APWRA] remained year-round residents of the broader region of the Diablo Range” and that “the high density of breeding golden eagles observed near APWRA by Hunt and Hunt (2006, 2013) extends into much of the broader surrounding region of the Diablo Range.” Wiens et al. (2015) estimate the Diablo Range population as containing about 280 breeding pairs (as of 2014).

~~Additionally, and under similar timing to the USFWS study, USGS recently conducted a survey and implemented a sampling design to estimate~~The USGS has estimated the occupancy, breeding success, and abundance of territorial pairs of golden eagles in the Diablo Range (Wiens et al. 2015); an additional USGS study focused on the APWRA and surrounding region (Kolar and Wiens 2017). A total of 138 territorial pairs of golden eagles were observed during surveys completed in the 2014 breeding season, representing about one-half of the 280 pairs (560 individuals) that the authors estimated to occur in the 1,996-square-mile region sampled. The results from Wiens et al. (2015) were further described specifically for the region surrounding the APWRA in Kolar and Wiens (2017). This recent work supports the current USFWS management guidelines for golden eagles, which considers surveys for occupied eagle territories when the territories may overlap with wind energy projects. The findings of the 2017 study indicated that the average nearest-neighbor distance of simultaneously occupied territories was approximately 3.2 km (approximately 2 miles~~) Bell (2017~~). This information is consistent with the approach to nesting eagle surveys in the PEIR (Mitigation Measure BIO-8a), which requires “Surveys to locate eagle nests within 2 miles of construction.…” The applicant has informed the County that at the recommendation of the USFWS, they have coordinated with USGS regarding eagle nests within the APWRA region, and have received nest information from USGS. The USGS expressed concerns about the sensitivity of the nest locations and requested that the information not be distributed publicly. ~~The applicant notes that those data indicate that between 2014 and 2019, USGS surveys have documented between 0-2 eagle nests each year with the APWRA. Furthermore, those data indicate that nest site fidelity is low within the APWRA (i.e., eagles are not nesting in the same locations from year to year). This information further~~However, nesting within the APWRA and areas within 3.2 km of the APWRA (i.e., golden eagle territories that are likely to be at least partially within the APWRA) have consistently recorded from 9 to 11 golden eagle pairs with 3 to 4 nesting attempts and 0 to 3 successful nestings, in surveys performed in 2014, 2015, 2016 and 2018 (Wiens and Kolar 2019). These territories were found to have fledged a total of 0 to 4 young per year. These numbers represent approximately 10%

of the golden eagle population of the Diablo Range (Wiens and Kolar 2019). The APWRA also supports a remarkably large number of nonbreeding, subadult golden eagles, which are present in the APWRA at approximately 4 times their density elsewhere in the Diablo Range. Wiens and Kolar (2019) interpret these results as indicating "potential disturbances caused by operating wind turbines at APWRA had little to no effect on the distribution and territory size of golden eagles" but that "territorial pairs of golden eagles at APWRA may experience a high rate of mortality and territory turnover (i.e., mate replacement) relative to the surrounding region, as shown by the high proportion of subadult pair members." This information supports the approach to nesting eagle surveys in the PEIR, which requires surveys to be conducted during the nesting season prior to construction in order to determine nesting status and locations at the time of construction.

Considering the information currently available, it is likely that the current estimate of 718 individuals in BCR 32, currently used by USFWS to estimate cumulative effects on golden eagles, is an underestimate. The USGS study estimates that there are ~~560 individuals (~~280 territorial pairs (i.e., a breeding population of 560 individuals) within the Diablo Range (Wiens et al. 2015:13). The Diablo Range encompasses approximately 2% of the total size of BCR 32. While eagle density is likely to vary dramatically over the landscape within BCR 32, it is unlikely that variability is so high that 78% of the population occupies just 2% of BCR 32, with only 22% of the population scattered throughout the remaining 98% of the BCR. It is much more likely that BCR 32 carries more than 718 individuals. USFWS requires that analysis of cumulative effects on golden eagle populations consider the "local area population" (LAP). The LAP is calculated for golden eagles based on the number of eagles within 109 miles (the golden eagle natal dispersal distance) of a project site (U.S. Fish and Wildlife Service 2013). For the proposed Project, the LAP encompasses approximately 29,600 square miles (excluding the Pacific Ocean and San Francisco Bay). The entire Diablo Range subject to study by USGS is within the Sand Hill LAP for golden eagles, occupying approximately 7% of the Sand Hill LAP. Therefore, 7% of the LAP includes all 560 individuals. The remaining 93% of the Sand Hill LAP supports significant areas with suitable habitat (generally oak or pine woodlands in a grasslands matrix) in the Coast Ranges north of San Francisco Bay and ~~significant~~substantial areas of suitable habitat south of the Diablo Range that USGS did not survey. Considering the available information, it is likely that the Sand Hill LAP comprises substantially more than 560 individuals. ~~Conservatively assuming~~For example, if one were to conservatively assume that the remaining 93% of the Sand Hill LAP supports only 50% of the density of eagles on average that the Diablo Range supports, then another 280 eagles may reside within the LAP, outside the Diablo Range. ~~Thus~~Under this illustration, at least 840 individuals are likely to make up the sand Hill LAP.

~~USFWS has identified authorized take rates of between 1 and 5% of the total estimated LAP as benchmarks, with authorized take of up to 5 percent being at the upper end of what might be appropriate under the Bald and Golden Eagle Act's preservation standard absent compensatory mitigation.~~ Hunt et al. (2017) recently examined demographic data for the region surrounding the APWRA and estimated that the annual reproductive output of 216–255 breeding pairs would have been necessary to support published estimates of 55–65 turbine blade-strike fatalities per year~~.~~ ~~Additional demographic modeling research related to golden eagle populations is ongoing and was recently described in Wiens et al. (2017). USFWS recently determined in an environmental assessment for the Shiloh IV Wind Project, approximately 30 miles north of the Sand Hill project, that the current mortality rate for the LAP was approximately 12% annually (U.S. Fish and Wildlife Service 2014). However, this estimate was based on an LAP estimate of 526 individuals and a total estimated take (within the LAP from all sources) of 64.5 individuals (47.5 of those estimated within the APWRA) (U.S. Fish and Wildlife Service 2014:36–38). Considering the recently available~~

~~information from USGS indicating that the LAP is likely substantially larger than previously estimated, cumulative impacts on the APWRA LAP are likely to be substantially lower than previously estimated by USFWS.~~, concluding that the area has "a stable breeding population, but one for which any further decrease in vital rates would require immigrant floaters [subadults and nonbreeding adults] to fill territory vacancies." This estimate would indicate that the 280 territorial pairs present in the Diablo Range would likely be adequate to maintain the region's golden eagle population, but with population reductions possible if turbine-caused mortality were to increase substantially. USFWS has expressed a similar opinion, asserting that "[t]he high incidence of subadults as territorial breeding pair members, and high turnover rates of individual pair members, indicates the APWRA is an ecological sink, continually attracting golden eagles into prime foraging and nesting habitat that is of high risk to eagles, and for which survivorship is low." (USFWS 2019)

Field Studies

To assess existing conditions and document biological resources in the 2,700-acre Project area, ICF conducted terrestrial and aquatic field surveys in October and November 2017 and January 2018. The surveys consisted of mapping vegetation community types, evaluating special-status plant and wildlife habitat, and performing an aquatic resource delineation. The aquatic resource delineation was undertaken with the purpose of characterizing potential waters of the United States, including wetlands, in the Project area. Detailed methods for terrestrial and aquatic resource surveys conducted in the Project area are described in the *Biological Resources Evaluation for the Sand Hill Wind Repowering Project* (ICF 2018a).

In addition to terrestrial and aquatic resources, surveys and evaluations have been conducted for avian and bat species known to utilize the Project area and the larger APWRA. A list of those studies conducted since the preparation of the PEIR are listed above under *Avian and Bat Fatalities References*. A description of recent survey efforts are described below.

Additional Avian Fatality Monitoring Studies

The APWRA supports a broad diversity of resident, migratory, and wintering bird species that regularly move through the area (Orloff and Flannery 1992). In particular, diurnal raptors (eagles and hawks) use the prevailing winds and updrafts for soaring and gliding during daily travel, foraging, and migration. Birds passing through the rotor plane of operating wind turbines are at risk of being injured or killed. Multiple studies of avian mortality in the APWRA show that substantial numbers of golden eagles, red-tailed hawks, American kestrels, burrowing owls, barn owls, and a diverse mix of non-raptor species are killed each year in turbine-related incidents in the years in which the first- and second-generation wind turbines were operating (Howell and DiDonato 1991; Orloff and Flannery 1992; Howell 1997; Smallwood and Thelander 2004; ICF International ~~2013b~~2016).

Since 2005, when the older generation of wind turbines were operating under new CUPs and with focused monitoring of avian mortality, efforts to reduce avian fatalities in the APWRA have focused primarily on two management actions: the shutdown of turbines during the winter period when use of the area by red-tailed hawks, golden eagles, and American kestrels is highest, and the removal of turbines determined to pose the highest collision risk based on history of fatalities, topographic position of the turbine, and other factors (Smallwood and Spiegel 2005a, 2005b, 2005c; ICF International ~~2013b~~2016). In the past decade the body of evidence had indicated that repowering could result in a substantial reduction in avian fatalities. Using the first few years of data from the

Alameda County Avian Fatality Monitoring Program, Smallwood and Karas (2009) concluded that the most effective way to reduce turbine-related avian fatalities in the APWRA is to repower.

The PEIR considered fatality monitoring results from three projects: Diablo Winds, Buena Vista, and Vasco Wind. Since the PEIR was prepared in 2014, an additional 2 years of monitoring for birds and bats at Vasco Wind were completed. The results were reported in Brown et al. (2016). Additionally, the Golden Hills project was constructed and 2 years of avian and bat monitoring have been completed (H. T. Harvey & Associates 2018a, 2018b).

Evidence collected to date from the four sites in the APWRA that have been repowered (Buena Vista, Diablo Winds, Golden Hills and Vasco Wind) suggests that the larger modern turbines cause substantially fewer turbine-related avian fatalities than the older generation turbines (Brown et al. 2013; ICF International ~~2013b~~2016; Alameda County Community Development Agency 2014; Brown et al. 2016; H. T. Harvey & Associates 2018a, 2018b). The Scientific Review Committee (SRC) for the APWRA, which convened between 2006 and 2015 also produced guidelines for siting wind turbines to reduce avian fatalities in the APWRA. The SRC evaluated topographic, wind pattern, bird behavior, and turbine siting variables related to hazardous conditions to provide guidance to the wind companies to reduce avian collision hazards (Alameda County Community Development Agency 2014).

The monitoring data sources cited above have resulted in considerable information on which to base conclusions about the effects of the Sand Hill repowering project. The monitoring program ran continuously between 2005 and 2015, and annual estimates of turbine-related avian fatality rates and estimates of the total number of birds killed each year are available for each bird year from 2005 through 2015. A bird year starts on October 1 and ends on September 30 and is named for the calendar year in which it starts. Bird years are used as the basis for analysis because they better reflect the timing of avian movements and ecology than do calendar years (ICF International 2016).

Bat Studies

The APWRA supports habitat types suitable for maternity, foraging, and migration for special-status and common bats. Several of these species are susceptible to direct mortality through collision or other interactions with wind turbines. Seven species of bat have been documented as fatalities in the APWRA: big brown bat, little brown bat, California myotis, western red bat, hoary bat, silver-haired bat, and Mexican free-tailed bat (Insignia Environmental 2012:47–48; ICF International 2016; ICF 2019:18). Hoary bats and Mexican free-tailed bats have made up the majority of documented fatalities. Other than fatality records, occurrence data for bat species in the APWRA are limited, and expectations of presence are generally based on known ranges and habitat associations. However, pre- and postconstruction acoustic survey data from the recently repowered Vasco Winds facility in the Contra Costa County portion of the APWRA indicated bat activity in all three seasons in which surveys were conducted, with a spike in activity in the fall (Pandion Systems 2010; Szewczak 2013). Mexican free-tailed bat and hoary bat comprised the majority of the acoustic detections (Pandion Systems 2010).

Relatively little is known about bat biology as it relates to fatality risk at wind energy facilities. Limited knowledge of such factors as migration, mating behavior, behavior around turbines, and seasonal movements impede efforts to predict risk of turbine collision. Studies at wind energy facilities in North America generally show strong seasonal and species-composition patterns in bat fatalities, with the bulk of fatalities consisting of migratory species and occurring in late summer to mid-autumn. As in other parts of North America, the majority of documented fatalities in the APWRA have occurred during the fall migration season and have consisted of migratory bat species.

Historically, the number of bat fatalities detected as part of the avian fatality monitoring program at old-generation turbines in the APWRA has been extremely low, due at least in part to the monitoring program's design, which has focused on bird mortality. As previous study methods were not designed to generate defensible bat fatality rates, and as new generation turbines may pose novel threats to bats, assumptions of species vulnerability based on extrapolation from the older turbine technologies present in the APWRA are not necessarily valid (Alameda County Community Development Agency 2014).

Data collected from 2005–2011 identified a total of 22 fatalities over a 7 year period within the APWRA, resulting in an average rate of between zero and six bat fatalities per year (ICF International 2013b). During 2012 surveys conducted by Smallwood (2013) for the Avian Validation Study, only one bat fatality, a Mexican free-tailed bat, was detected within the Project area. The recent monitoring reports for Golden Hills (H. T. Harvey & Associates 2018a, 2018b), however, provide much additional information regarding bat fatality rates following repowering. It is worth noting that the Golden Hills fatality monitoring results for the first 2 years represent the first use of scent-detection dogs for an extended period to conduct fatality searches in the APWRA (H. T. Harvey & Associates 2018a:xii; Smallwood 2018[2]). This approach yielded data on 271 bat mortalities during 2017-2018. The authors of the studies note that the use of scent detection dogs, as well as shorter search intervals, "clearly resulted in our detecting far greater numbers of bat fatalities than previously reported in the APWRA; however, similar estimates of per megawatt (MW) fatality rates in this study and the post-repowering Vasco Winds study suggest that repowering with larger, taller turbines also may have contributed to a higher fatality rate for bats" (H. T. Harvey & Associates 2018a:xiii). Further work by Smallwood et al. (2019) clearly establishes that use of trained dogs and their handlers in detection surveys is essential to effective estimation of bat fatalities, and also provides estimates of correction factors to identify mortalities outside the search area. Behavioral studies of bats also illuminate understanding of how and why bat fatalities occur at wind turbines; relevant information not presented in the PEIR, or available since publication of the DSEIR indicates:

- Most bat fatalities represent "tree bats", which are migratory species that typically forage in the forest canopy (the hoary bat, which is the bat most frequently found in APWRA fatality surveys, is a tree bat). The bats evidently regard wind turbines as a sort of tree and fly towards them, and towards their upper reaches, where they suffer mortality (Allison et al. 2019; Arnett et al. 2016; Cryan et al. 2014a).
- Bats preferentially forage at turbines (Foo et al. 2017).
- Bats are attracted to turbines, especially under certain conditions, approaching turbines from downwind on moonlit nights (Cryan et al. 2014a), especially at wind velocities lower than about 5-6 m/s; at higher wind speeds, bats avoid the rotor-swept zone (Wellig et al. 2018).

[2] Smallwood (2018) conducted surveys using detection dogs at the Golden Hills and Buena Vista sites for a limited period (compared with the overall Golden Hills study described in H. T. Harvey & Associates 2018a, 2018b).

- Some fraction of fatalities are caused by barotrauma, rather than by turbine blade strike (Baerwald et al. 2008; Grodsky et. al. 2011).
- Curtailment has been a highly effective mitigation strategy, with the latest algorithms achieving fatality reductions of more than 80% with about 3% loss of turbine output (Hayes et al. 2019).
- Curtailment during the peak migration period has been shown to greatly reduce bat fatalities (Smallwood and Bell 2019).
- Wind energy developments kill over 600,000 bats annually in the coterminous U.S. (Hayes 2013). Due to the proliferation of wind energy developments, white-nose syndrome (disease), insect die-off, and intrinsically low bat reproductive rates, there has been a recent measurable decline in hoary bat populations in the Pacific Northwest (Frick et al. 2017), and population models suggest that despite the current abundance of this species (ca. 2.5 million bats), declines in abundance with local extirpations are possible in the foreseeable future if currently-observed mortality rates are not reduced (Rodhouse et al. 2019).
- Hoary bats in North America are migratory, overwintering in southern California and Mexico, so hoary bat fatalities recorded in the APWRA during the fall migration may in large part represent bats from northern areas such as the Pacific Northwest and western Canada (Baerwald et al. 2014; Cryan et al. 2014b; Weller et al. 2016).

Additional discussion of potential biases resulting from comparisons of this and other studies are presented in the analysis of potential Project impacts on bats.

Land Cover Types

A *land cover type* is defined as the dominant character of the land surface discernible from aerial photographs, as determined by vegetation, water, or human uses. Land cover types are the most widely used units in analyzing ecosystem function, habitat diversity, natural communities, wetlands and streams, and covered species habitat.

The eight land cover types within the Project area are summarized in Table 3.4-1 and described below. Land cover data is from the PEIR and additional site-specific surveys of aquatic resources (Figures 3.4-1a–3.4-1c).

Table 3.4-1. Approximate Acreage of Land Cover Types

Land Cover/Habitat Type	Acres
Nonnative annual grassland	2,604.7
Developed/existing infrastructure	54.7
Alkali wetland/drainage	20.1
Vernal pool	0.3
Perennial wetland drainage	9.7
Pond	6.3
Ephemeral drainage	3.7
Canal (aqueducts)	1.0
Total	2,700.5

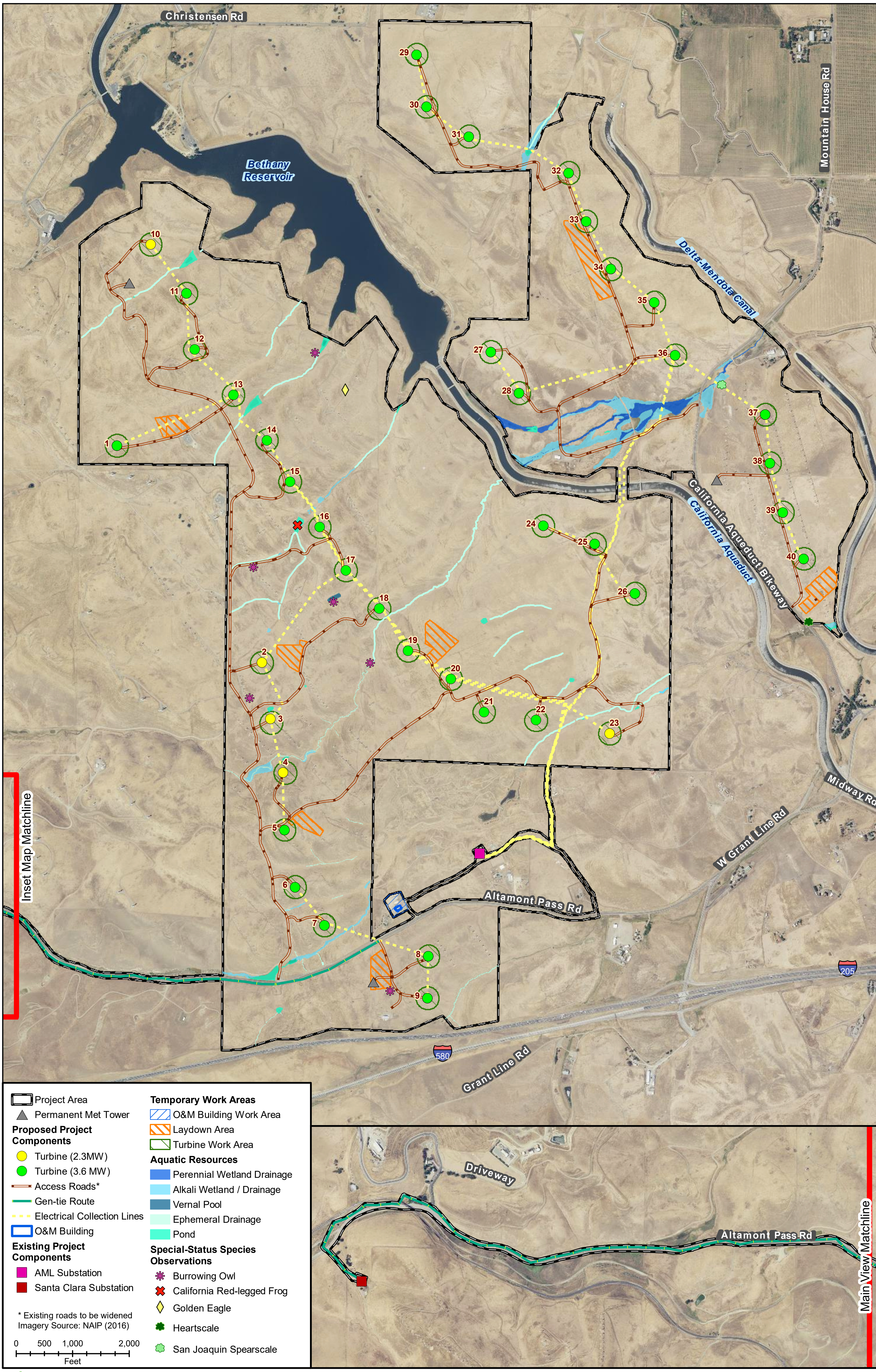

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Figure 3.4-1a
Land Cover Types in the Sand Hill Wind Repowering Project Area—Layout 1

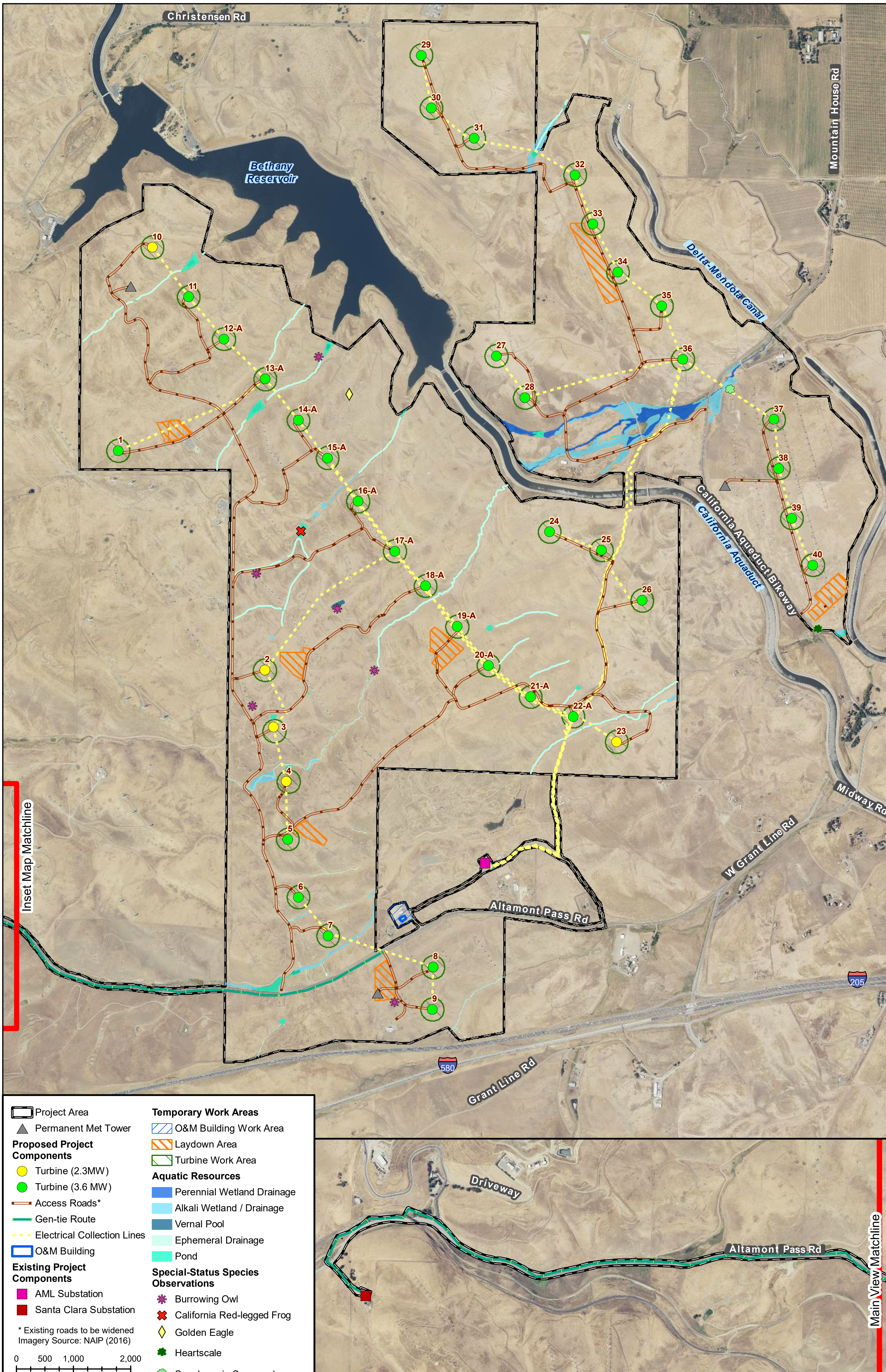

Figure 3.4-1b
Land Cover Types in the Sand Hill Wind Repowering Project Area—Layout 2

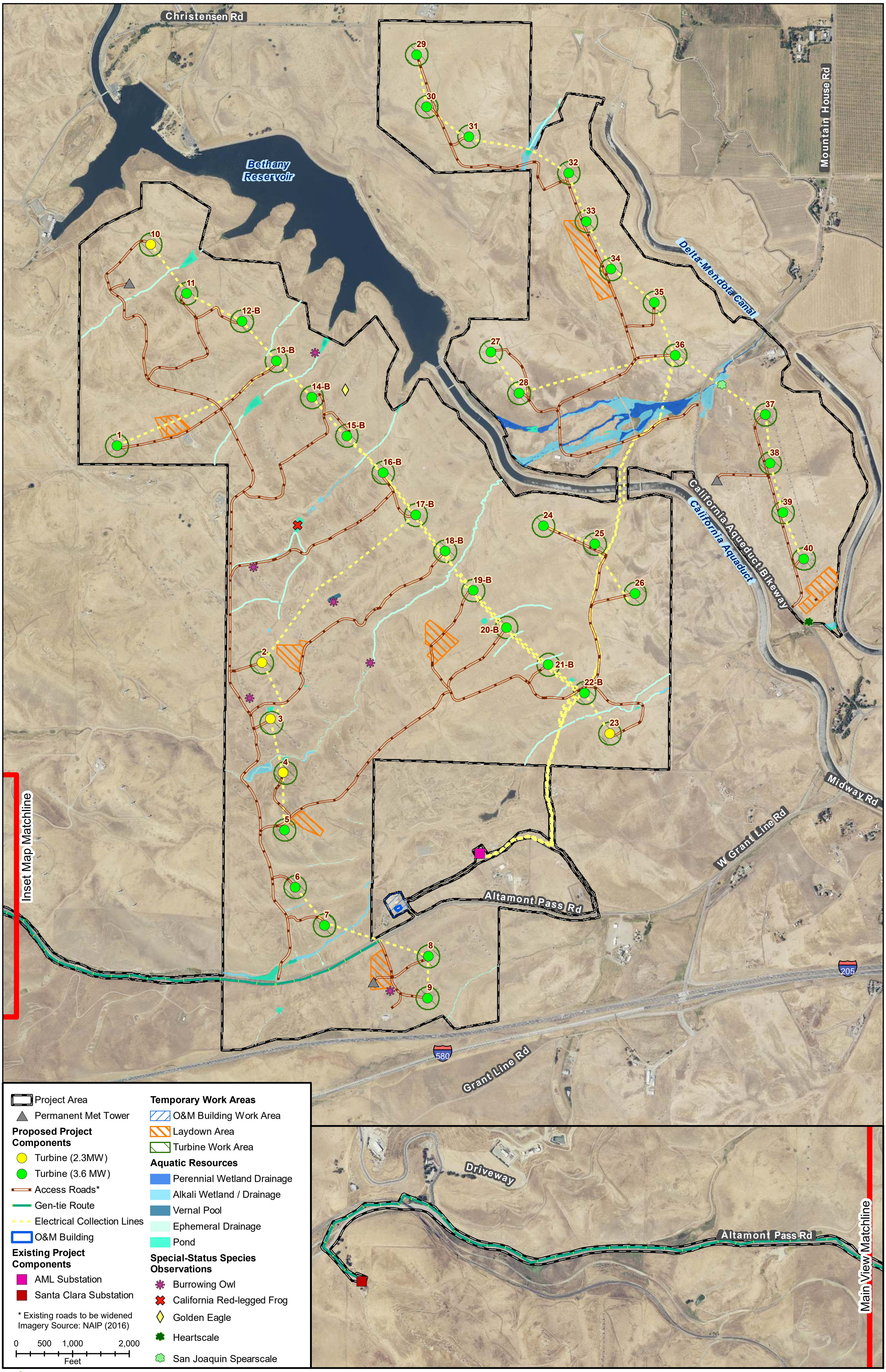

Figure 3.4-1c
Land Cover Types in the Sand Hill Wind Repowering Project Area—Layout 3

Wetlands (vernal pool, alkali wetland/drainage, perennial wetland drainage) and nonwetland waters (pond, ephemeral drainage, canal) mapped within the Project area are considered potential waters of the United States and waters of the state that would be subject to federal regulations under CWA Sections 401 and 404 and to state regulation under the Porter-Cologne Water Quality Control Act. In addition, the wetland and nonwetland waters exhibiting a bed and bank would be regulated under California Fish and Game Code Section 1602.

Nonnative Annual Grassland

Nonnative annual grassland, the most common biological community in the delineation area, is an herbaceous community dominated by naturalized annual grasses intermixed with perennial and annual forbs. Annual grassland in the Project area commonly exhibits low levels of diversity and is dominated by ripgut brome (*Bromus diandrus*), soft chess brome (*Bromus hordeaceous*), yellow star-thistle (*Centaurea solstitialis*), Italian ryegrass (*Festuca perennis*), and wild oat (*Avena fatua*).

Alkali Wetland/Drainage

Alkali wetlands support ponded or saturated soil conditions and occur as perennial or seasonally wet features on alkali soils. Alkali wetlands occur primarily along stream channels where alkali soils are present. This land cover type occurs along Altamont Creek and in several drainages south of the Alameda/Contra Costa County line and west of Bethany Reservoir.

The vegetation of alkali wetlands is composed of halophytic plant species adapted to both wetland conditions and high salinity levels. The community is dominated almost entirely by saltgrass (*Distichlis spicata*), associated with Baltic rush (*Juncus balticus*) and alkali heath (*Frankenia salina*). Nonnative annual grasses such as sea barley (*Hordeum marinum* subsp. gussoneanum) and soft chess brome are also common associates.

Vernal Pool

The single vernal pool in the Project area is in a shallow depression at the top of a hill in the eastern portion of the Project area. Remnant vegetation observed during the fall was dominated by popcornflower (*Plagiobothrys* sp.) and woolly marbles (*Psilocarphus brevissimus*).

Perennial Wetland Drainage

Perennial wetland drainages in the Project area support emergent wetland vegetation dominated by rabbitsfoot grass (*Polypogon monspeliensis*), watercress (*Nasturtium officinale*), saltgrass in shallow water habitats, and narrow leaf cattail (*Typha angustifolia*) in deeper water habitats.

Ephemeral Drainage

Ephemeral drainages occur in low-lying areas and valley bottoms in the Project area. Some ephemeral drainages are unvegetated, while others are dominated by nonnative annual grassland species as described above.

Pond

Ponds in the Project area are small permanent or seasonal bodies of water that have been constructed for the purposes of retaining runoff water for livestock use. The surface area of these features fluctuates widely throughout the year. In the Project area, these features are located in low-lying drainages and valley bottoms, and the vegetation surrounding them is typically dominated by saltgrass and nonnative annual grassland species.

Special-Status Plants

Based on a review of the CNDDB (California Department of Fish and Wildlife 2018) and CNPS Inventory (California Native Plant Society 2019), 25 special-status plant species were identified as having recorded occurrences and/or the potential to occur in the Project vicinity (within approximately 5 miles of the Project area) (Table 3.4-2 at the end of Section 3.4.1 and Appendix C1). Grassland and wetland habitats present in the Project area have moderate or high potential to support the following 19 special-status plants. The remaining species in Table 3.4-2 are not expected to occur in the Project area based on the specific microhabitat conditions and geographic range.

- Large-flowered fiddleneck (*Amsinckia grandiflora*)—state- and federally listed as endangered.
- Bent-flowered fiddleneck (*Amsinckia lunaris*)—California Rare Plant Rank (CRPR) 1B.2.
- Alkali milk-vetch (*Astragalus tener* var. *tener*)—CRPR 1B.2.
- Heartscale (*Atriplex cordulata*)—CRPR 1B.2.
- Brittlescale (*Atriplex depressa*)—CRPR 1B.2.
- Lesser saltscale (*Atriplex miniscula*)—CRPR 1B.1.
- Big-scale balsamroot (*Balsamorhiza macrolepis*)—CRPR 1B.2.
- Big tarplant (*Blepharizonia plumosa*)—CRPR 1B.1.
- Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*)—CRPR 1B.2.
- Hispid bird's-beak (*Chloropyron molle* ssp. *hispidum*)—CRPR 1B.1.
- Livermore tarplant (*Deinandra bacigalupii*)—state endangered and CRPR 1B.2.
- Recurved larkspur (*Delphinium recurvatum*)—CRPR 1B.2.
- Diamond-petaled California poppy (*Eschscholzia rhombipetala*)—CRPR 1B.1.
- San Joaquin spearscale (*Extriplex joaquiniana*)—CRPR 1B.2.
- Showy golden madia (*Madia radiata*)—CRPR 1B.1.
- Shining navarretia (*Navarretia nigelliformis* ssp. *radians*)—CRPR 1B.2.
- Rayless ragwort (*Senecio aphanactis*)—CRPR 2B.2.
- Long-styled sand spurry (*Spergularia macrotheca* var. *longistyla*)—CRPR 1B.2.
- Caper-fruited tropidocarpum (*Tropidocarpum capparideum*)—CRPR 1B.1.

Three of these species have been previously documented within or adjacent to the Project area: San Joaquin spearscale, caper-fruited tropidocarpum, and diamond-petaled California poppy (Figure 3.4-3a). Surveys of part of the Project area during late summer and early fall of 2012 did not identify and special-status plants, but surveys in spring of 2013 identified heartscale in the survey area (ICF International 2012 and Alphabiota Environmental Consulting 2013). The survey area for the 2012 and 2013 surveys did not include the entire area that is now part of the Project.

Special-Status Wildlife

Based on a review of the CNDDB (2019), the USFWS species list (U.S. Fish and Wildlife Service 2019), and the EACCS (ICF International 2010), as well as other environmental documents prepared for recent repowering projects near the Project area, ~~31~~32 special-status wildlife species were identified as having the potential to occur in the Project vicinity (Table 3.4-3 at the end of Section 3.4.1 and Appendix C2 and C3).

Several special-status wildlife species listed in Table 3.4-3—~~golden eagle (*Aquila chrysaetos*),~~ peregrine falcon (*Falco peregrinus anatum*), California black rail (*Laterallus jamaicensis coturniculus*), pallid bat (*Antrozous pallidus*), and Townsend's big-eared bat (*Corynorhinus townsendii*)— may forage over the Project area but are not expected to breed onsite based on the lack of nesting and roosting habitat. Numerous other special-status birds may occur in the Project area during migration and while foraging, but these species are not addressed specifically in this report because they are not known to nest in the area and thus would only be potentially subject to operational effects. Such species are relevant to and part of this analysis to the extent they have been identified through post-construction mortality studies in the APWRA.

Based on an assessment of existing conditions, grassland and aquatic habitats in the Project area have the potential to support the following special-status wildlife species. A description of suitable habitat and likelihood of occurrence in the Project area for these species is provided in Table 3.4-3 and discussed below.

- Vernal pool fairy shrimp (*Branchinecta lynchi*)—federally listed as threatened.
- Vernal pool tadpole shrimp (*Lepidurus packardi*)—federally listed as endangered.
- California tiger salamander (*Ambystoma californiense*)—state- and federally listed as threatened.
- California red-legged frog (*Rana draytonii*)—federally listed as threatened.
- Western spadefoot (*Spea hammondii*)—CDFW species of special concern.
- Western pond turtle (*Actinemys marmorata*)—CDFW species of special concern.
- San Joaquin coachwhip (*Masticophis flagellum ruddocki*)—CDFW species of special concern.
- Blainville's horned lizard (*Phrynosoma blainvillii*)—CDFW species of special concern.
- Western spadefoot toad—CDFW species of special concern.
- Bald eagle (*Haliaeetus leucocephalus*)—California fully protected, federal BGEPA.
- Golden eagle (*Aquila chrysaetos*)—California fully protected, federal BGEPA.
- White-tailed kite (*Elanus leucurus*)—California fully protected.
- Northern harrier (*Circus cyaneus*)—CDFW species of special concern.
- Swainson's hawk (*Buteo swainsoni*)—state-listed as threatened.
- Western burrowing owl (*Athene cunicularia*)—CDFW species of special concern.
- Loggerhead shrike (*Lanius ludovicianus*)—CDFW species of special concern.
- Tricolored blackbird (*Agelaius tricolor*)—state-listed as threatened.
- American badger (*Taxidea taxus*)—CDFW species of special concern.

- San Joaquin kit fox (*Vulpes macrotis mutica*)—state-listed as threatened; federally listed as endangered.

California red-legged frogs were observed during surveys conducted in 2012 for another wind project in a portion of the Project area (ICF International 2013a); burrowing owls and foraging golden eagles were observed in the Project area during both 2012 and October 2017 surveys.

Aquatic habitat and special-status wildlife species observations made during the field surveys are depicted in Figures 3.4-2a–3.4-2c. Special-status species identified in the Project vicinity are depicted on Figure 3.4-3b.

Vernal Pool Fairy Shrimp and Vernal Pool Tadpole Shrimp

Vernal pool fairy shrimp and vernal pool tadpole shrimp are known to occur in the Project region; however, no CNDDB occurrences have been documented in the Project area (California Department of Fish and Wildlife 2019). The closest CNDDB occurrence of vernal pool fairy shrimp is approximately 0.5 mile north of the Project area (Figure 3.4-3b). Suitable habitat for vernal pool fairy shrimp and vernal pool tadpole shrimp in the Project area consists of alkali wetlands, small seasonal ponds, and a vernal pool (Figures 3.4-1a–3.4-1c).

California Red-Legged Frog

California red-legged frog was documented in the Project area during 2012 surveys conducted within a portion of the Project area (ICF International 2013a). Suitable aquatic breeding habitat in the Project area consists of perennial and semi-perennial ponds and perennial wetland drainages. California red-legged frogs may also use alkali wetlands and drainages and ephemeral drainages throughout the Project area for dispersal and foraging (Figures 3.4-2a–3.4-2c). Annual grassland throughout the Project area represents suitable upland dispersal habitat for this species. The CNDDB lists numerous (more than 15) occurrences within 1 mile of the Project area (Figure 3.4-3b).

The entire Project area is within critical habitat unit ALA-2 for California red-legged frog (75 FR 12816, 12907). Primary constituent elements (PCEs) of designated critical habitat for this species include (1) aquatic breeding habitat (ponds, streams, wetlands); (2) aquatic nonbreeding (e.g., freshwater features not suitable for breeding) and riparian habitat; (3) upland habitats associated with riparian and aquatic habitat that provide food and shelter; and (4) dispersal habitat (i.e., accessible upland or riparian habitat within and between occupied or previously occupied sites that are located within 1 mile of each other, and that do not contain barriers—e.g., heavily traveled roads without bridges or culverts—to dispersal). All four PCEs are present within the Project area.

California Tiger Salamander

California tiger salamander has not been previously documented in the Project area; however, several ponds and a vernal pool in the Project area provide suitable aquatic breeding habitat (Figures 3.4-2a–3.4-2c). The CNDDB lists several (six) occurrences within 1.24 miles of the Project area (Figure 3.4-3b). Suitable upland habitat for the species is present in annual grasslands throughout the Project area and all grassland habitat in the Project area is within 1.24 miles (generally considered a max dispersal distance) of a known breeding location.

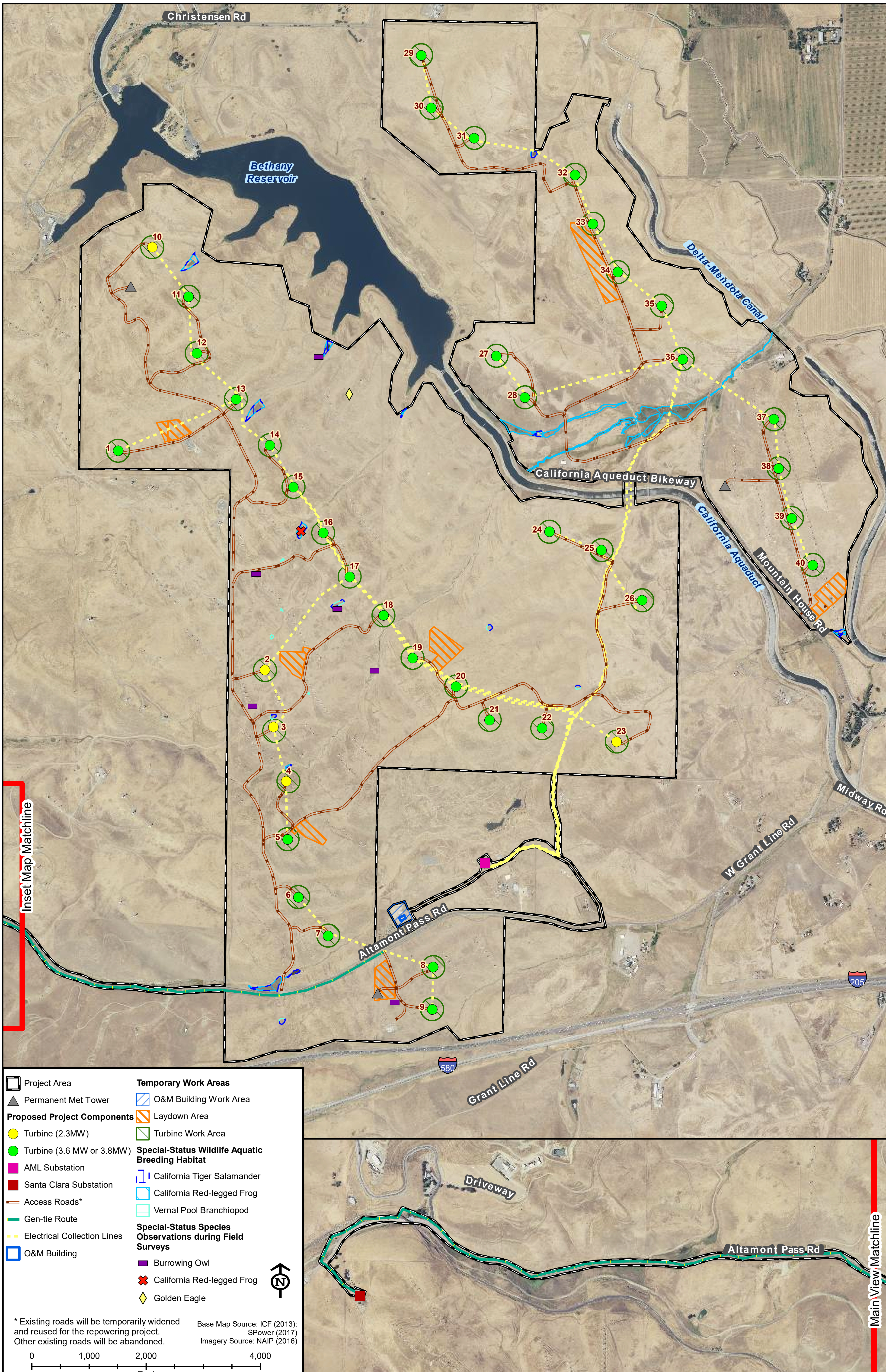

Figure 3.4-2a
Species and Habitat Observations in the Sand Hill Wind Repowering Project Area–Layout 1

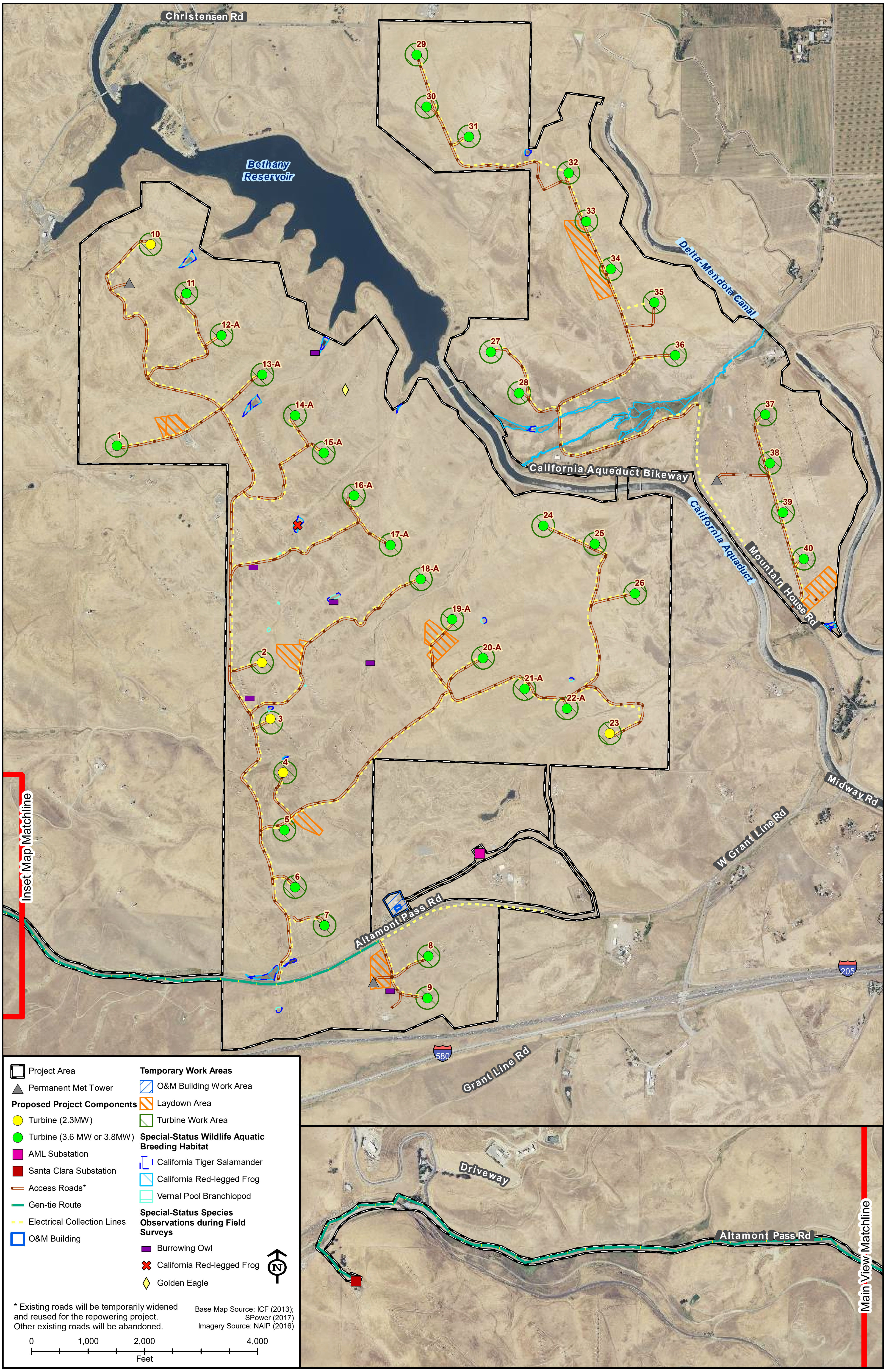

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Figure 3.4-2b
Species and Habitat Observations in the Sand Hill Wind Repowering Project Area–Layout 2

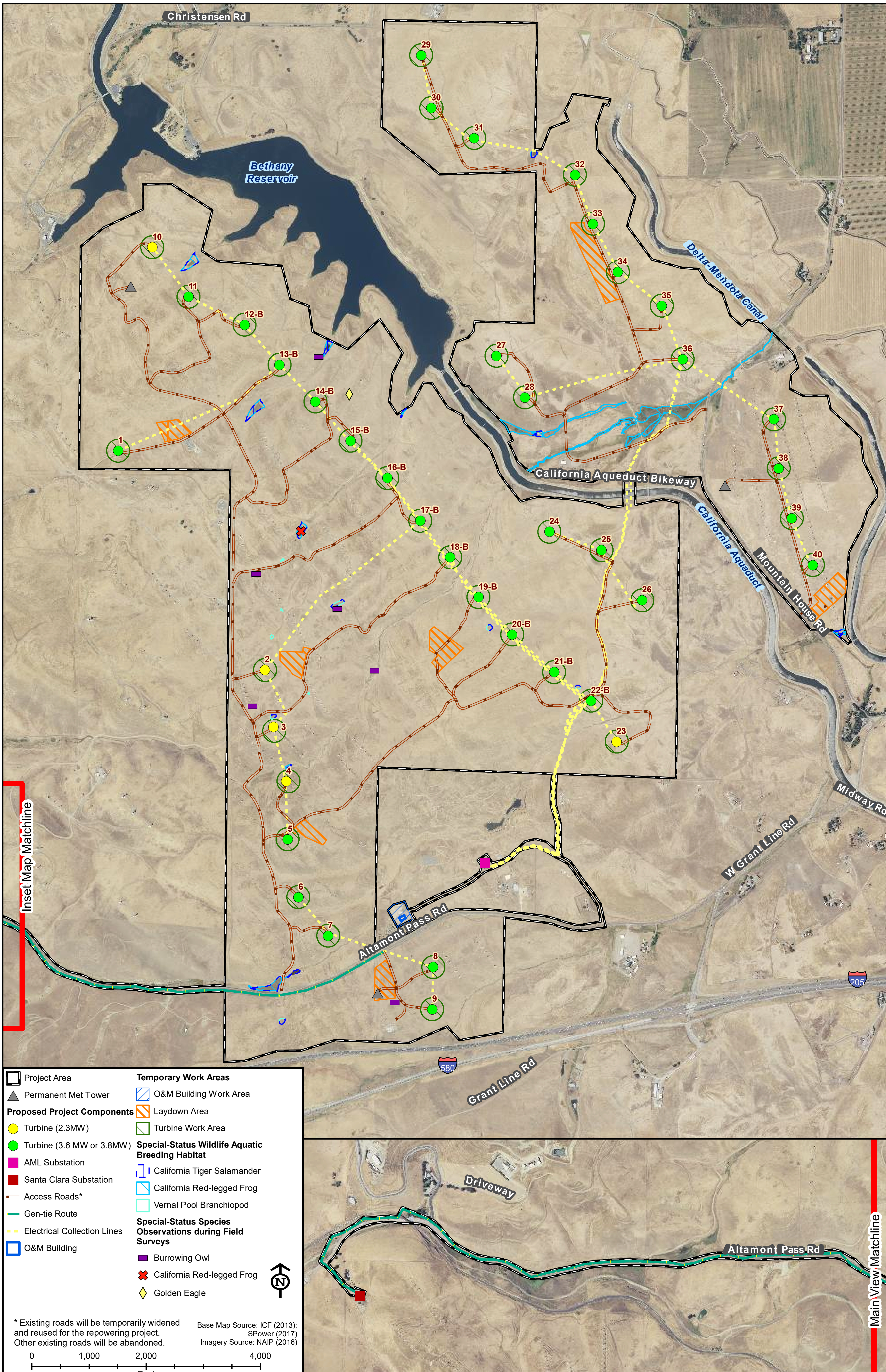

Figure 3.4-2c
Species and Habitat Observations in the Sand Hill Wind Repowering Project Area–Layout 3

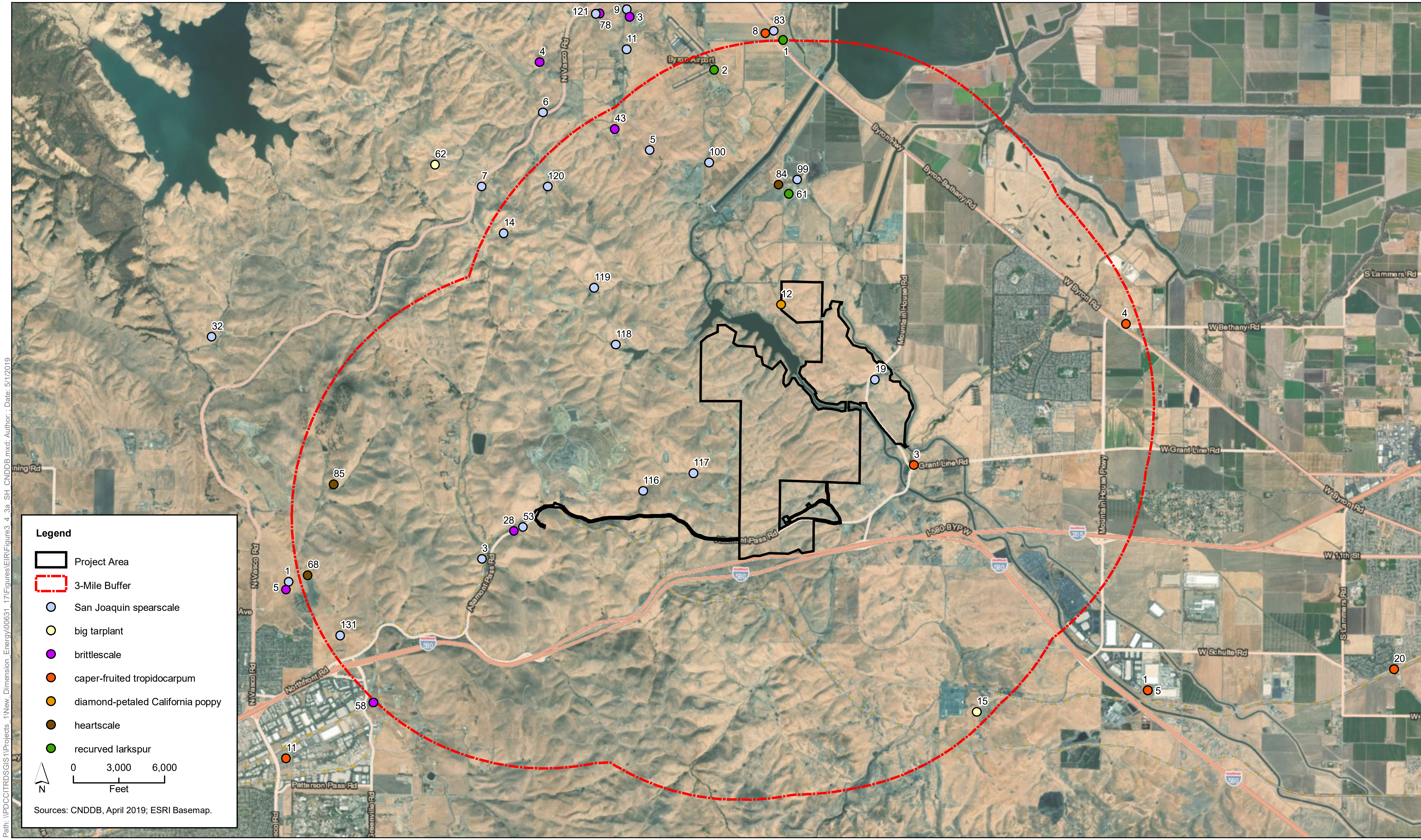

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Figure 3.4-3a
California Natural Diversity Database - Plants

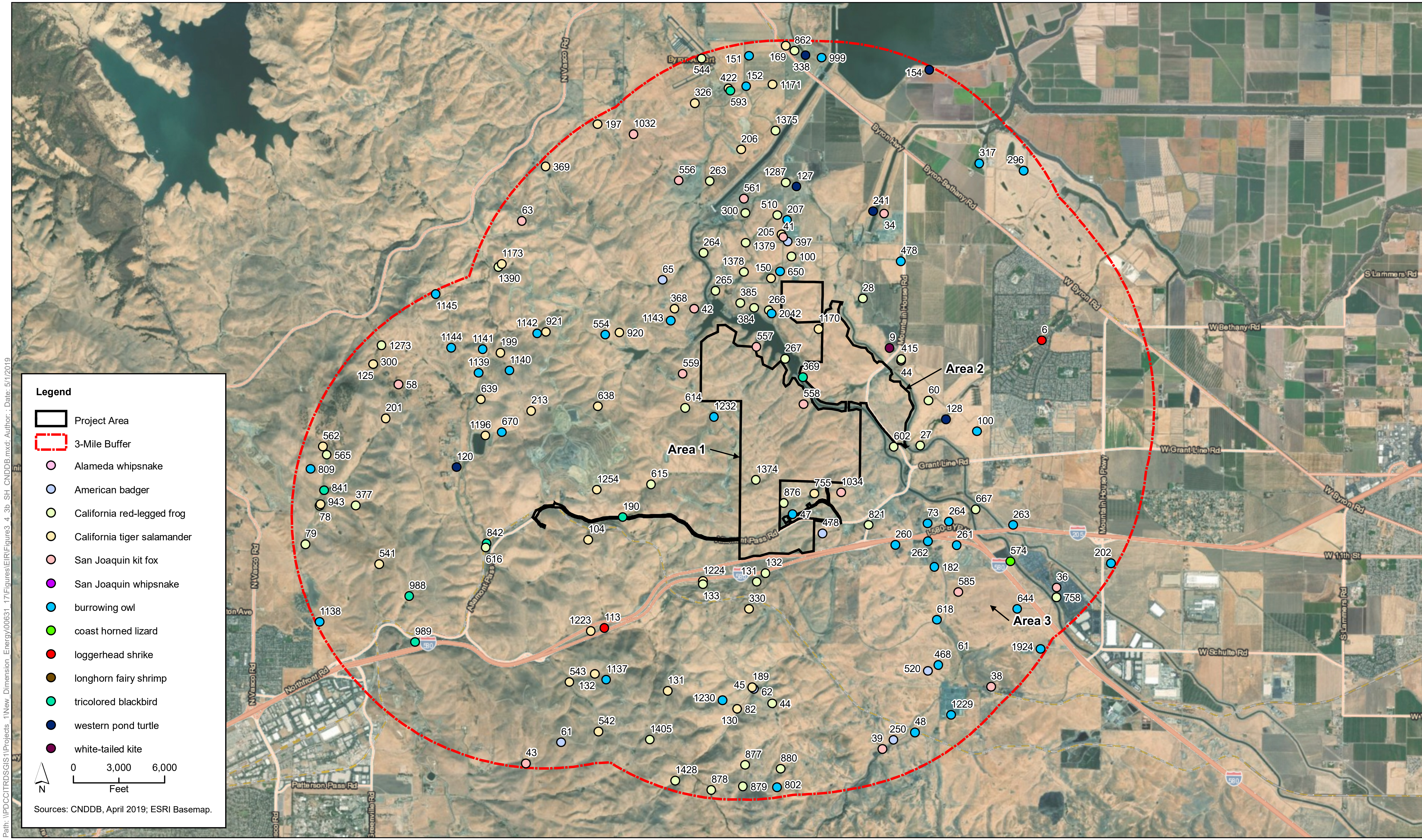

Figure 3.4-3b
California Natural Diversity Database - Wildlife

Western Spadefoot Toad

Western spadefoots have not been previously documented in the Project area and there are no CNDDB records within 3 miles of the Project area. However, the Project is at the western edge of the range of the species and several ponds, alkali wetlands, and a vernal pool in the Project area provide suitable aquatic breeding habitat for this species (Figures 3.4-2a–3.4-2c). Suitable upland habitat for the species is present in annual grasslands throughout the Project area.

Bald Eagle

Bald eagles have been observed in the Project area, where they forage at the nearby reservoir; there is potential for them to nest in trees or on powerline towers within the Project area, in sight of the reservoir.

Golden Eagle

Golden eagles have commonly been observed foraging in the Project area. There is potential for them to nest in trees or on powerline towers within the Project area, as detailed earlier in "Additional Studies on Golden Eagle".

Western Pond Turtle

Where water is present, ponds, ephemeral drainages, and perennial wetland drainages in the Project area provide potential aquatic habitat for western pond turtles. If pond turtles are present they could deposit eggs in the nearby grassland habitat. The closest CNDDB occurrence of western pond turtle is approximately 0.5 mile east of the Project area (Figure 3.4-3b).

Blainville's Horned Lizard and San Joaquin Coachwhip

Annual grassland in the Project area provides suitable habitat for Blainville's horned lizard and San Joaquin coachwhip where substrate conditions exist: friable soils and rocky areas for Blainville's horned lizard and small mammal burrows for San Joaquin coachwhip.

Western Spadefoot Toad

Alkali wetlands, small seasonal ponds, and a vernal pool in the Project area provide suitable breeding habitat for western spadefoot toad. Annual grassland in the vicinity of these aquatic resources provides upland habitat for adult spadefoots.

White-tailed Kite and Swainson's Hawk

Suitable nesting habitat for white-tailed kite and Swainson's hawk in the Project area is limited to scattered trees along paved roads and transmission towers. Annual grassland in the Project area is densely populated with small rodents (e.g., voles and mice) that provide abundant prey for raptors including Swainson's hawk and white-tailed kite. The closest CNDDB nesting records for Swainson's hawk and white-tailed kite are approximately 0.25 mile north and east of the Project area (Figure 3.4-3b).

Northern Harrier

Grasslands and wetland vegetation associated with aquatic resources within the Project area provide suitable nesting habitat for northern harriers. Potential foraging habitat is present for harriers throughout the Project area. Northern harriers have been documented to forage year-round throughout the greater APWRA.

Burrowing Owl

Grasslands throughout the Project area provide suitable nesting and wintering habitat for burrowing owls. Burrowing owls were observed at six locations in the Project area during surveys conducted in 2012 and 2017 (Figures 3.4-2a–3.4-2c) and are presumed to be using the Project area for breeding and wintering. During the October 2017 surveys, one confirmed nest site was identified adjacent to a vernal pool mapped in the eastern portion of the Project area (Figures 3.4-2a–3.4-2c), based on the presence of numerous owl pellets, white wash, and abundant downy feathers from young. Smallwood also reported finding 5 burrowing owls within the Project area in 2017 (Smallwood 2019). There are also numerous reported occurrences of burrowing owls throughout grasslands surrounding the Project area (California Department of Fish and Wildlife 2019). Furthermore, “burrowing owl distribution is dynamic in the APWRA, and it is also clustered” (Smallwood et al. 2011), thus such results are expected to change from year to year.

Loggerhead shrike

Loggerhead shrikes were observed during surveys conducted in 2012 for earlier repowering efforts (ICF International 2013a). Nesting habitat is limited to scattered trees and shrubs in the Project area. Locally nesting loggerhead shrikes could forage in grassland habitat throughout the Project area.

Tricolored Blackbird

Perennial wetland drainage habitat in the Project area provides suitable nesting substrate for tricolored blackbirds where wetland vegetation is dense and extensive. Grasslands and aquatic habitats throughout the Project area provide suitable foraging areas. No confirmed nesting has been documented within the Project area. The closest CNDDB nesting records for tricolored blackbird are along Altamont Pass Road and the California Aqueduct, adjacent to the Project area (Figure 3.4-3b).

American Badger

No potential badger dens were observed during field surveys; however, grasslands throughout the Project area provide suitable habitat for American badger. The CNDDB lists several occurrences within 1 mile north and south of the Project area (Figure 3.4-3b).

San Joaquin Kit Fox

The Project area is within the northern range of San Joaquin kit fox. Suitable denning, foraging, and dispersal habitat is present in annual grassland throughout the Project area, and many burrows sufficiently sized for kit foxes are present. The CNDDB lists several historic records for San Joaquin kit fox within 2 miles of the Project area (Figure 3.4-3b). These observations date from between 1972 and 1998. Since 1998, the population structure of San Joaquin kit fox has become more fragmented, with some resident satellite populations (particularly in the northern range) having been locally extirpated (U.S. Fish and Wildlife 2010:15).

The northern range of San Joaquin kit fox includes a narrow band of habitat along the western edge of the San Joaquin Valley from San Luis Reservoir in western Merced County north to central Alameda and Contra Costa Counties (linkage corridor) that is generally characterized by highly fragmented habitat of low suitability. Based on current habitat conditions, the northern range is unlikely to support a population of San Joaquin kit foxes (Cypher et al. 2013). Evidence indicates that kit foxes north of Santa Nella either occur at extremely low densities or, more likely, are only intermittently present (Constable et al. 2009). Given the low frequency of sightings in the region and the extent of habitat fragmentation between known populations in the southern portion of the species' range and the Project area, San Joaquin kit fox has a low likelihood of occupying the Project area.

Non-Special-Status Migratory Birds and Raptors

Ground-nesting migratory birds and raptors have the potential to nest and forage in the Project area. Tree- and shrub-nesting habitat in the Project area is limited; however, existing structures within the Project area could provide atypical nesting habitat for migratory birds and raptors, including electrical towers/poles, buildings, and non-working turbines or turbine parts. The breeding season for migratory birds and raptors generally extends from February through August, although nesting periods vary by species.

Table 3.4-2. Special-Status Plants Known to Occur or that May Occur in the Sand Hill Wind Repowering Project Area and Vicinity

Species	Status[a] Federal/State/CRPR	California Distribution	Habitats	Blooming Period	Likelihood to Occur in Project Area
Amsinckia grandiflora Large-flowered fiddleneck	E/E/1B.1	Foothills of Mount Diablo in Alameda, Contra Costa, and San Joaquin Counties; currently known from only three natural occurrences	Open grassy slopes in annual grasslands and cismontane woodlands	April–May	Moderate—suitable annual grassland habitat is present throughout the Project area; however, the species is only known from three localities in California and is not documented within the Project area. Designated critical habitat for the species occurs approximately 2 miles southeast from the Project area
Amsinckia lunaris Bent-flowered fiddleneck	–/–/1B.2	Alameda, Contra Costa, Lake, Marin, Santa Cruz, Shasta, and Siskiyou Counties	Cismontane woodland, valley and foothill grassland	March–June	Moderate—suitable annual grassland habitat is present throughout the Project area
Astragalus tener var. *tener* Alkali milk-vetch	–/–/1B.2	Historically found in western San Joaquin Valley, San Francisco Bay Area, and Monterey County; likely extirpated from all historical occurrences except those in Merced, Solano, and Yolo Counties	Playas and grasslands with adobe clay soils and alkaline vernal pools	March–June	High—suitable annual grassland and alkali habitats are present throughout the Project area
Atriplex cordulata Heartscale	–/–/1B.2	Western Central Valley and valleys of adjacent foothills	Alkali grasslands, alkali meadows, alkali scrublands	May–October	High—suitable annual grassland and alkali habitats are present throughout the Project area, observed onsite in 2013 (Alphabiota 2013)
Atriplex depressa Brittlescale	–/–/1B.2	Western Central Valley and valleys in foothills on west side of Central Valley	Alkali grasslands, alkali meadows, alkali scrublands, chenopod scrublands, playas, valley and foothill grasslands; on alkaline or clay soils	May–October	High—suitable annual grassland and alkali habitats are present throughout the Project area
Atriplex minuscula Lesser saltscale	–/–/1B.1	Sacramento and San Joaquin Valley, Butte County to Kern County	Alkali sink and sandy alkaline soils in grasslands, chenopod scrub, between 65 and 325 feet above msl	May–October	High—suitable annual grassland and alkali habitats are present throughout the Project area

Species	Status[a] Federal/State/CRPR	California Distribution	Habitats	Blooming Period	Likelihood to Occur in Project Area
Balsamorhiza macrolepis var. *macrolepis* Big-scale balsamroot	–/–/1B.2	Scattered occurrences in Coast Ranges and Sierra Nevada foothills.	Chaparral, cismontane woodland, valley and foothill grassland, sometimes on serpentine soils, at 295–4,593 feet.	March–June	Moderate—suitable annual grassland habitat within Project area
Blepharizonia plumosa ssp. *plumosa* Big tarplant	–/–/1B.1	Interior Coast Range foothills in Alameda, Contra Costa, San Joaquin, Stanislaus,[b] and Solano[b] Counties	Dry hills and plains in annual grasslands	July–October	High—suitable annual grassland habitat in the Project area
Caulanthus lemmonii Lemmon's jewel-flower	–/–/1B.2	Southeast San Francisco Bay Area, south through the South Coast Ranges and adjacent San Joaquin Valley to Ventura County	Dry, exposed slopes in grasslands and pinyon-juniper woodland	March–May	Low—limited habitat is present in the Project area
Centromadia parryi ssp. *congdonii* Congdon's tarplant	–/–/1B.2	Eastern San Francisco Bay Area, Salinas Valley, and Los Osos Valley	Lower slopes, flats, and swales in annual grasslands; locally on alkaline or saline soils	June–November	High—suitable annual grassland habitat and alkaline soils are present in the Project area; species is known to occur along Altamont Pass Road near the Project area
Chloropyron molle ssp. *hispidum* Hispid bird's-beak	–/–/1B.1	Central Valley (Kern, Fresno, Merced, Placer, and Solano Counties) and Alameda County	Meadows, grasslands, and playas; on alkaline soils	June–September	Moderate—suitable annual grassland habitat and alkaline soils are present in the Project area
Chloropyron palmatus Palmate-bracted bird's-beak	E/E/1B.1	Known from seven populations in Livermore Valley and Central Valley from Colusa County to Fresno County	Alkali grasslands, alkali meadows, and chenopod scrublands	May–October	Low—suitable alkali grassland habitat within Project area, but species has a very limited distribution
Deinandra bacigalupii Livermore tarplant	~~–/–/~~–/E/1B.2	Endemic to Alameda County (Livermore Valley)	Alkaline meadows and seeps, not in Jepson Manual	June–October	Moderate—moist alkali soils are present in the Project area
Delphinium recurvatum Recurved larkspur	–/–/1B.2	San Joaquin Valley and interior valleys of the south Coast Ranges, Contra Costa County to Kern County	Subalkaline soils in annual grassland, saltbush scrub, cismontane woodland, vernal pools	March–May	High—suitable annual grassland habitat and alkaline soils are present in the Project area

Species	Status[a] Federal/State/CRPR	California Distribution	Habitats	Blooming Period	Likelihood to Occur in Project Area
Eschscholzia rhombipetala Diamond-petaled poppy	–/–/1B.1	Interior foothills of south Coast Ranges from Contra Costa County to Stanislaus County, Carrizo Plain in San Luis Obispo County	Grassland, chenopod scrub, on clay soils, where grass cover is sparse enough to allow growth of low annuals	March–April	Moderate—suitable annual grassland habitat within Project area
Extriplex joaquiniana San Joaquin spearscale (saltbush)	–/–/1B.2	West margin of Central Valley from Glenn to Tulare Counties	Alkali grasslands, alkali scrublands, alkali meadows, saltbush scrublands	April–September	High—suitable annual grassland and alkali habitats are present throughout the Project area; species has been documented within the Project area
Lasthenia conjugens Contra Costa goldfields	E/–/1B.1	Scattered occurrences in Coast Range valleys and southwest edge of Sacramento Valley, Alameda, Contra Costa, Mendocino, Monterey, Napa, Santa Barbara, Santa Clara, and Solano Counties	Alkaline or saline vernal pools and swales, below 1,542 feet	March–June	Low—suitable alkali soils and swales may be present but no nearby occurrences
Madia radiata Showy golden madia	–/–/1B.1	Scattered populations in the interior foothills of the South Coast Ranges: Contra Costa,[b] Fresno, Kings,[b] Kern, Monterey,[b] Santa Barbara,[b] San Benito, Santa Clara, San Joaquin,[b] San Luis Obispo, and Stanislaus Counties	Oak woodland, valley and foothill grassland, slopes	March–May	Moderate—suitable annual grassland habitat within Project area
Myosurus minimus ssp. *apus* Little mousetail	–/–/3.1	Central Valley and South Coast from Butte County south to San Diego County; Baja California, Oregon	Valley and foothill grassland, alkaline vernal pools	March–June	Low—suitable alkali soils are present in the Project area but no nearby occurrences
Navarettia nigelliformis ssp. *radians* Shining navarretia	–/–/1B.2	Interior foothills of South Coast Ranges from Merced County to San Luis Obispo County	Mesic areas with heavy clay soils, in swales and clay flats, in oak woodland, grassland	April–July	High—suitable swales in the Project area; species is known to occur at western edge of the Project area
Plagiobothrys glaber Hairless popcorn-flower	–/–/1A	Coastal valleys from Marin County to San Benito County	Alkaline meadows, coastal salt marsh	April–May	Low—suitable alkali soils are present in the Project area but no nearby occurrences

Species	Status[a] Federal/State/CRPR	California Distribution	Habitats	Blooming Period	Likelihood to Occur in Project Area
Senecio aphanactis Rayless ragwort	–/–/2B.2	Scattered locations in central western and southwestern California, from Alameda County to San Diego County	Oak woodland, coastal scrub, chaparral, open sandy or rocky areas, on alkaline soils	January–April	High—suitable alkaline soils and rocky outcrops in the Project area
Spergularia macrotheca var. *longistyla* Long-styled sand spurrey	–/–/1B.2	Alameda, Contra Costa, Napa, and Solano Counties	Meadows and seeps, alkaline marshes and swamps	February–May	High—suitable alkaline soils in the Project area; species is known to occur in the Project area
Trifolium depauperatum var. *hydrophilum* Saline clover	–/–/1B.2	Alameda, Colusa, Monterey, Napa, San Benito, Santa Clara, San Luis Obispo, San Mateo, Solano, and Sonoma Counties	Marshes and swamps, valley and foothill grassland (mesic, alkaline), and vernal pools	April–June	Low—suitable annual grassland habitat within Project area but no nearby occurrences
Tropidocarpum capparideum Caper-fruited tropidocarpum	–/–/1B.1	Historically known from the northwest San Joaquin Valley and adjacent Coast Range foothills	Grasslands in alkaline hills	March–April	High—suitable grassland and alkaline soils in the Project area; species is known to occur along Grant Line Road adjacent to the Project area

Sources: California Department of Fish and Wildlife (2018); California Native Plant Society (2019); Alphabiota Environmental Consulting (2013).

[a] Status explanations:

Federal

E = listed as endangered under the ESA; – = no listing.

State

E = listed as endangered under the CESA; – = no listing.

California Rare Plant Rank (CRPR)

1A = List 1A species: presumed extinct in California; 1B = List 1B species: rare, threatened, or endangered in California and elsewhere; 2 = List 2 species: rare, threatened, or endangered in California but more common elsewhere.

CRPR Code Extensions

0.1 = seriously endangered in California (over 80% of occurrences threatened/high degree and immediacy of threat; 0.2 = fairly endangered in California (20–80% of occurrences threatened).

[b] Populations uncertain or extirpated in the county.

Table 3.4-3. Special-Status Wildlife Species Known to Occur or that May Occur in the Sand Hill Wind Repowering Project Area and Vicinity

Scientific Name Common Name	Status Federal/State	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Project Area
Invertebrates				
Branchinecta longiantenna Longhorn fairy shrimp	E/–	Eastern margin of central Coast Ranges from Contra Costa County to San Luis Obispo County; disjunct population in Madera County	Small, clear pools in sandstone rock outcrops of clear to moderately turbid clay- or grass-bottomed pools	None—Rock outcrop pools are not present in the Project area
Branchinecta lynchi Vernal pool fairy shrimp	T/–	Central Valley, central and south Coast Ranges from Tehama County to Santa Barbara County; isolated populations also in Riverside County	Common in vernal pools; also found in sandstone rock outcrop pools	Moderate—Several alkali wetlands, small ephemeral ponds, and a vernal pool in the Project area provide suitable habitat
Lepidurus packardi Vernal pool tadpole shrimp	T/–	Shasta County south to Merced County	Vernal pools and ephemeral stock ponds	Moderate—Several alkali wetlands, small ephemeral ponds, and a vernal pool in the Project area provide suitable habitat
Desmocerus californicus Valley elderberry longhorn beetle	T/–	Streamside habitats below 3,000 feet above sea level throughout the Central Valley	Riparian and oak savanna habitats with elderberry shrubs and streamside habitats below 3,000 feet above sea level. Elderberry shrub is the host plant.	None—Elderberry host plants not observed in the Project area
Fish				
Acipenser medirostris Green sturgeon	T/SSC	In marine waters of the Pacific Ocean from the Bering Sea to Ensenada, Mexico. In rivers from British Columbia south to the Sacramento River, primarily in the Klamath/Trinity and Sacramento Rivers	Primarily marine, using large anadromous freshwater rivers and associated estuaries for spawning and rearing	None—outside of species known range and no suitable habitat present
Hypomesus transpacificus Delta smelt	T/~~T~~E	Primarily in the Sacramento–San Joaquin Estuary, but has been found as far upstream as the mouth of the American River on the Sacramento River and Mossdale on the San Joaquin River; range extends downstream to San Pablo Bay	Occurs in estuary habitat in the Delta where fresh and brackish water mix in the salinity range of 2–7 parts per thousand (Moyle 2002)	None—No suitable habitat (estuary) in the Project area

Scientific Name Common Name	Status Federal/State	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Project Area
Oncorrhynchus mykiss Central California Coastal steelhead Distinct Population Segment (DPS)	T/-	Coastal drainages along the central California coast	An anadromous fish that spawns and spends a portion of its life in inland streams, typically maturing in the open ocean	None—no perennial streams suitable for anadromous fish are present in the Project area
Oncorrhynchus mykiss Central Valley steelhead DPS	T/–	Sacramento and San Joaquin River and their tributaries	An anadromous fish that spawns and spends a portion of its life in inland streams, typically maturing in the open ocean	None—no perennial streams suitable for anadromous fish are present in the Project area
Amphibians				
Ambystoma californiense California tiger salamander	T/T	Central Valley, including Sierra Nevada foothills, up to approximately 1,000 feet, and coastal region from Sonoma County south to Santa Barbara County	Small ponds, lakes, or vernal pools in grasslands and oak woodlands for larvae; rodent burrows, rock crevices, or fallen logs for cover for adults and for summer dormancy	High—Species has not been previously detected in the Project area but several records exist within 1.24 mile of the Project area (CNDDB 2019). Many ponds, alkali wetlands, and a vernal pool in the Project area represent suitable breeding habitat and grasslands provide upland habitat
Rana boylii Foothill yellow-legged frog	–/~~SSC~~C	Occurs in the Klamath, Cascade, north Coast, south Coast, Transverse, and Sierra Nevada Ranges up to approximately1,800 meters (6,000 feet)	Creeks or rivers in woodland, forest, mixed chaparral, and wet meadow habitats with rock and gravel substrate and low overhanging vegetation along the edge. Usually found near riffles with rocks and sunny banks nearby	None—no suitable streams with rocky, gravel substrate and overhanging vegetation are present within the Project area
Rana draytonii California red-legged frog	T/SSC	Found along the coast and coastal mountain ranges of California from Mendocino County to San Diego County and in the Sierra Nevada from Butte County to Stanislaus County	Permanent and semipermanent aquatic habitats, such as creeks and cold-water ponds, with emergent and submergent vegetation; may estivate in rodent burrows or cracks during dry periods	High—Project area is entirely within critical habitat for California red-legged frog (Unit ALA-2). The species was detected in the Project area during 2012 field surveys. Many ponds and perennial wetland drainages throughout the Project area represent suitable aquatic habitat and grasslands provide upland dispersal habitat

Scientific Name Common Name	Status Federal/State	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Project Area
Western spadefoot *Spea hammondii*	–/SSC	Sierra Nevada foothills, Central Valley, and Coast Ranges.	Seasonal wetlands such as vernal pools and stock ponds in annual grasslands and oak woodlands	Many ponds, alkali wetlands, and a vernal pool in the Project area represent suitable breeding habitat and grasslands provide upland habitat.
Reptiles				
Actinemys marmorata Western pond turtle	–/SSC	Uncommon to common in suitable aquatic habitat throughout California, west of the Sierra-Cascade crest and absent from desert regions, except in the Mojave Desert along the Mojave River and its tributaries	Occupies ponds, marshes, rivers, streams, and irrigation canals with muddy or rocky bottoms and with watercress, cattails, water lilies, or other aquatic vegetation in woodlands, grasslands, and open forests. Nests are typically constructed in upland habitat within 0.25 mile of aquatic habitat.	Moderate—where water is present, ponds, ephemeral drainages, and perennial wetland drainages in the Project area provide potential aquatic habitat. Annual grasslands adjacent to aquatic habitats provide potential nesting areas for pond turtles.
Masticophis flagellum ruddocki San Joaquin coachwhip	–/SSC	From Colusa county in the Sacramento Valley southward to the grapevine in the San Joaquin Valley and westward into the inner coast ranges. An isolated population occurs at Sutter Buttes. Known elevational range from 20–900 meters (66–2,953 feet).	Occurs in open, dry, vegetative associations with little or no tree cover; in valley grassland and saltbush scrub associations; and often occurs in association with mammal burrows	Moderate—suitable grassland habitat is present within the Project area; known occurrences just southwest of the Project area (CNDDB 2019)
Masticophis lateralis euryxanthus Alameda whipsnake	T/T	Restricted to Alameda and Contra Costa Counties; fragmented into five disjunct populations throughout its range	Valleys, foothills, and low mountains associated with northern coastal scrub or chaparral habitat; requires rock outcrops for cover and foraging	None—grassland habitat is present throughout the Project area but preferred vegetation associations (scrub and chaparral) and rock outcrops used for cover are not present in or near the Project area. The closest suitable scrub habitats are approximately 3 miles northwest of the Project area; accordingly, the species is not expected to occur in the Project area

Scientific Name Common Name	Status Federal/State	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Project Area
Phrynosoma blainvillii Blainville's (Coast) horned lizard	–/SSC	Sacramento Valley, including foothills, south to southern California; Coast Ranges south of Sonoma County; below 1,200 meters (4,000 feet) in northern California	Grasslands, brushlands, woodlands, and open coniferous forest with sandy or loose soil; requires abundant ant colonies for foraging	Moderate—Annual grasslands provide potential habitat for the species but microhabitat conditions such as loose soils and open areas are limited within the Project area
Spea hammondii Western spadefoot	–/SSC	Sierra Nevada foothills, Central Valley, Coast Ranges, coastal counties in southern California	Shallow streams with riffles; seasonal wetlands, such as vernal pools in annual grasslands and oak woodlands	Moderate—Project area is within the species known range and suitable aquatic and upland habitat is present in the Project area
Thamnophis gigas Giant garter snake	T/T	Central Valley from the vicinity of Burrel in Fresno County to near Chico in Butte County; extirpated from areas south of Fresno	Sloughs, canals, low-gradient streams, and freshwater marshes where there is a prey base of small fish and amphibians. Also irrigation ditches and rice fields. Requires grassy banks and emergent vegetation for basking and areas of high ground protected from flooding during winter.	None—no suitable habitat is present in the Project area and there are no nearby occurrences (CNDDB 2019)

Scientific Name Common Name	Status Federal/State	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Project Area
Mammals				
Antrozous pallidus Pallid bat	–/SSC	Low elevations throughout California	Occurs in a variety of habitats from desert to coniferous forest; most closely associated with oak, yellow pine, redwood, and giant sequoia habitats in northern California. Prefers rocky outcrops, cliffs, and crevices with access to open habitats for foraging. Uses caves, crevices, mines, and hollow trees for roosting.	Low—may forage in the Project area but no suitable roosting habitat is present
Corynorhinus townsendii Townsend's big-eared bat	–/SSC	Widespread throughout California	Roosts in caves, tunnels, mines, crevices, hollow trees, and buildings; usually near water	Low—may forage in the Project area but no suitable roosting habitat is present
Taxidea taxus American badger	–/SSC	In California, badgers occur throughout the state except in humid coastal forests of northwestern California in Del Norte and Humboldt Counties	Badgers occur in a wide variety of open, arid habitats but are most commonly associated with grasslands, savannas, mountain meadows, and open areas of desert scrub; the principal habitat requirements for the species appear to be sufficient food (burrowing rodents), friable soils, and relatively open, uncultivated ground.	High—Suitable habitat is present throughout the Project area. Species documented along Altamont Pass Road adjacent to the Project area (CNDDB 2019)
Vulpes macrotis mutica San Joaquin kit fox	E/T	Principally occurs in the San Joaquin Valley and adjacent open foothills to the west; recent records from 17 counties extending from Kern County north to Contra Costa County	Saltbush scrub, grassland, oak, savanna, and freshwater scrub	Low—Suitable habitat is present throughout the Project area. While there have been no recent sighting of kit fox within the project vicinity for more than 20 years, there is a potential for incidental use of the Project area by foxes dispersing from the central San Joaquin Valley

Scientific Name Common Name	Status Federal/State	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Project Area
Birds				
Laterallus jamaicensis coturniculus California black rail	–/T, FP	Found along San Francisco Bay, the Delta, coastal southern California, the Salton Sea, lower Colorado River, and some in land areas in the northern Sacramento Valley and adjacent foothills	Found in brackish and freshwater emergent marshes, typically in high wetland zone near the upper limit of flooding	Low—could migrate through the Project area but no suitable nesting habitat is present
Haliaeetus leucocephalus Bald eagle	D/E, FP	~~Nests in Siskiyou, Modoc, Trinity, Shasta, Lassen, Plumas, Butte, Tehama, Lake, and Mendocino Counties and in the Lake Tahoe Basin; reintroduced into central coast; winter range includes the rest of California, except the southeastern deserts, very high altitudes in the Sierra Nevada, and east of the Sierra Nevada south of Mono County~~Bald eagles may be found throughout most of California at lakes, reservoirs, rivers, and some rangelands and coastal wetlands. The State's breeding habitats are mainly in mountain and foothill forests and woodlands near reservoirs, lakes, and rivers.	In western North America, nests and roosts in ~~coniferous forests~~tall trees within 1 mile of a lake, reservoir, or stream, or the ocean	High—species ~~winters~~occurs in the APWRA and may forage ~~adjacent to~~or nest within the Project area. Nesting habitat occurs at Bethany Reservoir~~; however, no suitable~~ and nesting ~~or foraging habitat (large lakes, reservoirs,~~is possible at trees or ~~rivers) is present~~transmission line towers in the Project area
Aquila chrysaetos Golden eagle	–/FP	Foothills and mountains throughout California; uncommon nonbreeding visitor to lowlands such as the Central Valley	Nests in cliffs and escarpments or tall trees; forages in annual grasslands, chaparral, or oak woodlands that provide abundant ~~medium and large-sized~~ mammals (ground squirrels and larger) for prey	High—species is known to occur in the APWRA and suitable nesting and foraging habitat ~~is~~are present within the Project area~~; however, no suitable nesting habitat is present in the Project area~~

Scientific Name Common Name	Status Federal/State	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Project Area
Buteo swainsoni Swainson's hawk	–/T	Lower Sacramento and San Joaquin Valleys, Klamath Basin, and Butte Valley; highest nesting densities occur near Davis and Woodland, Yolo County	Nests in oaks or cottonwoods in or near riparian habitats; forages in grasslands, irrigated pastures, and grain fields	High—species is known to occur in the APWRA; limited nesting habitat (large trees) is present in the Project area but the species could forage in annual grassland throughout the Project area; documented nest sites within 1 mile north of the Project area (CNDDB 2019)
<u>*Circus cyaneus*</u> <u>Northern harrier</u>	<u>–/SSC</u>	<u>Breeds and winters throughout much of the state occurring between sea level near the coast and up to 9000 feet in Mono County.</u>	<u>Occurs in grasslands, meadows, marshes, and seasonal and agricultural wetlands throughout lowland California.</u>	<u>High—species is known to occur in the APWRA and is likely to breed and forage within grasslands and in the Project area</u>
Elanus leucurus White-tailed kite	–/FP	Lowland areas west of Sierra Nevada from the head of the Sacramento Valley south, including coastal valleys and foothills to western San Diego County at the Mexico border	Low foothills or valley areas with valley or live oaks, riparian areas, and marshes near open grasslands for foraging	High—species is known to occur in the APWRA and is likely to forage in the Project area; limited nesting habitat (large trees) is present in the Project area
Falco peregrinus anatum American peregrine falcon	D/D<u>, FP</u>	Permanent resident of the north and south Coast Ranges; may summer on the Cascade and Klamath Ranges south through the Sierra Nevada to Madera County; winters in the Central Valley south through the Transverse and Peninsular Ranges and the plains east of the Cascade Range	Nests and roosts on protected ledges of high cliffs, usually adjacent to lakes, rivers, or marshes that support large populations of other bird species	Low—potential winter migrant; foraging areas limited and no suitable nesting habitat is present
Athene cunicularia Burrowing owl	–/SSC	Lowlands throughout California, including the Central Valley, northeastern plateau, southeastern deserts, and coastal areas; rare along south coast	Level, open, dry, heavily grazed or low stature grassland or desert vegetation with available burrows	High—species observed during winter and summer surveys within grassland habitat throughout the Project area. Several CNDDB occurrences are present within and adjacent to the Project area

Scientific Name Common Name	Status Federal/State	Geographic Distribution	Habitat Requirements	Likelihood to Occur in the Project Area
Lanius ludovicianus Loggerhead shrike	–/SSC	Resident and winter visitor in lowlands and foothills throughout California; rare on coastal slope north of Mendocino County, occurring only in winter	Prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches; nests in densely foliaged trees or shrubs	High—species was observed in the Project area during 2012 surveys and suitable foraging habitat is present throughout the Project area; nesting habitat is limited to scattered shrubs or small trees near farm areas
Agelaius tricolor Tricolored blackbird	–/T	Permanent resident in the Central Valley from Butte County to Kern County; breeds at scattered coastal locations from Marin County south to San Diego County and at scattered locations in Lake, Sonoma, and Solano Counties; rare nester in Siskiyou, Modoc, and Lassen Counties	Nests in dense colonies in emergent marsh vegetation, such as tules and cattails, or upland sites with blackberries, nettles, thistles, and grain fields; habitat must be large enough to support 50 pairs; probably requires water at or near the nesting colony	High—perennial wetland drainage habitat in the Project area provides suitable nesting substrate; foraging habitat is present throughout the Project area. Two confirmed nesting colonies have been documented along Altamont Pass Road and the California Aqueduct adjacent to the Project area (CNDDB 2019)

Status explanations:

Federal

E = listed as endangered under the ESA; T = listed as threatened under the ESA; PT = proposed for federal listing as threatened under the ESA; C = species for which USFWS has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed rule to list, but issuance of the proposed rule is precluded; D = delisted; – = no listing.

State

E = listed as endangered under CESA; T = listed as threatened under CESA; C = Candidate for listing under CESA; FP = fully protected under the California Fish and Game Code; SSC = species of special concern in California; D = delisted; FP = fully protected species under CFGC; – = no listing.

Potential Occurrence in the Project Area

High = Known occurrences of the species within the Project area, or CNDDB, or other documents, records the occurrence of the species within a 10-mile radius of the Project area; suitable habitat is present within the Project area; Moderate = CNDDB, or other documents, records the known occurrence of the species within a 10-mile radius of the Project area; poor quality suitable habitat is present within the Project area; Low = CNDDB, or other documents, does not record the occurrence of the species within a 10-mile radius of the Project area; suitable habitat is present within the Project area.

3.4.2 Environmental Impacts

This section assesses the impacts on biological resources that could result from construction, maintenance, and decommissioning of the proposed Project.

Methods for Analysis

Impact Mechanisms

Biological resources could be directly or indirectly affected during Project implementation. The following impact mechanisms were analyzed to assess Project-related impacts on biological resources in the Project area.

- Excavation to support removal of old turbine foundations and construction of new turbine foundations.
- Temporary ground disturbance associated with trenching to install power collection system.
- Temporary ground disturbance associated with staging areas and crane pads.
- Temporary stockpiling and side-casting of soil, construction materials, or other construction wastes.
- Permanent widening and compaction of existing access roads to a 20-foot width.
- Temporary widening of existing access roads to 40 feet and construction of new roads to accommodate construction.
- Construction of new access roads.
- Short-term noise from equipment during decommissioning and construction activities.
- Temporary disturbance associated with O&M activities.
- Decommissioning and reclamation activities.
- Avian or bat collision with wind turbines.

Impact Assumptions

Impacts on biological resources are based on the following assumptions about the Project.

- Repower activities, including decommissioning and construction, are expected to occur over a 6- to 9-month period.
- All ground-disturbing activities would occur during dry weather.
- Excavation required to remove foundations of old turbines next to proposed new turbines would occur within the disturbance footprint of the proposed turbine.
- Removal of turbines that are not located next to a proposed turbine would only have surface ground disturbance and would not require any excavation because foundations would remain in place.

- All equipment staging, materials storage, and vehicle parking would be within one of the seven designated staging areas, within the limits of construction for each turbine site, or on existing access roads.
- No new substation or operations and maintenance buildings would be required for Project implementation.
- The widening of existing access roads is required on most roads and would be considered a permanent loss of upland habitat for terrestrial species unless temporary to support construction.
- The widening of access roads beyond the 20-foot width to support construction would be a temporary.
- All impacts associated with decommissioning activities would be temporary.
- No suitable habitat for special-status fish species (including green sturgeon [*Acipenser medirostris*], Delta smelt [*Hypomesus transpacificus*], central California coastal steelhead Distinct Population Segment [DPS] [*Oncorhynchus mykiss*], and Central Valley steelhead DPS [*Oncorhynchus mykiss*] or designated critical habitat for these species occurs in the Project area. Therefore, potential impacts on fish species and their critical habitat are not discussed in this impact analysis.

Avian Fatality Analysis Methods

Fatality Rates

Most commonly used estimators of avian fatalities at wind development projects calculate the *rate* at which birds are killed. Historically, the most commonly used metric has been the number of birds killed *per MW* per year, where MWs are measured as the rated nameplate capacities of the turbines. The rated nameplate capacity of a turbine is the amount of power it can generate under its ideal conditions (different turbines are designed to operate most efficiently under different conditions). The number of fatalities per MW per year has been used most often because it facilitates comparisons across a number of different turbine types with different sizes and rated nameplate capacities. The fatality rate is then multiplied by the total number of MWs in the facility, to obtain the estimate of the total number of birds killed each year at the facility.

The baseline estimate of the number of birds killed annually for each project is based on available monitoring data for each project, and for the total number of MWs that were installed (referred to as the *total installed capacity*) of each project.

In order to estimate fatality rate changes associated with repowering, the average of the annual estimates of each fatality rate from the 2005–2011 bird years (n=7 years) provided by the Alameda County Avian Fatality Monitoring Program (ICF International 2013b) was used to generate a baseline fatality rate for old-generation turbines only (i.e., results from the Diablo Winds and Buena Vista repowering projects were excluded because they are not considered old-generation turbines).

The average was used because the annual fatality rates vary considerably from year to year. Fatality rates for repowered projects were based on post-construction monitoring results presented for the Buena Vista (Alameda County Community Development Agency 2014), Diablo Winds (Alameda County Community Development Agency 2014), Golden Hills (H. T. Harvey & Associates 2018a, 2018b), and Vasco Wind (Alameda County Community Development Agency 2014; Brown et al.

2016) projects. Again, annual averages were used as the basis for comparison. Of these four repowered projects, Buena Vista comprises 38 1-MW turbines, Diablo Winds has 31 660-kW turbines, Golden Hills has 48 1.79-MW, and Vasco Winds has 34 2.3-MW turbines (Insignia Environmental 2012; Brown et al. 2013; ICF International 2013b; ICF 2019). Although there is considerable range in turbine sizes among these four projects, they are all considered new-generation turbines relative to the rest of the turbines installed in the APWRA. The annual fatality rates (expressed as fatalities per MW per year) for these four repowering projects are presented in Table 3.4-4, along with the average of the annual fatality rates at nonrepowered turbines for comparison. However, it should be noted that the rate estimates available from new-generation repowered turbines in the APWRA may not be representative of rates that would occur at other locations in the APWRA. This is because the four existing repowered project sites each have different turbine types and are located in four relatively small, distinct areas with site-specific geographic, topographic, and other ecological conditions, and because the primary species of concern are not evenly distributed throughout the APWRA.

The analysis was applied to species, listed in Table 3.4-4, representing five groups: focal species, species of local conservation concern, raptors (including owls and turkey vultures), non-raptors, and all birds. *Focal species* identified in the PEIR included American kestrel, burrowing owl, golden eagle, and red-tailed hawk, loggerhead shrike, prairie falcon, Swainson's hawk~~, white-tailed kite [~~ [listed as threatened under CESA~~, and~~], white-tailed kite [fully protected under CFGC], tricolored blackbird [listed as threatened under CESA], and barn owl.

ICF biologists compared the baseline number of fatalities for each species and species group calculated as outlined above to the number of fatalities expected to occur as a result of repowering. The number of fatalities expected to occur as a result of repowering was based on the 417 and 450 MW build-out scenarios for the two program alternatives and on the size of each of the projects measured in MWs, as outlined in Chapter 2, *Project Description*.

Table 3.4-4. Annual Adjusted Fatality Rates for Nonrepowered and Repowered APWRA Turbines

		Repowered			
Species/Group	Not Repowered[a]	Diablo Winds[b]	Buena Vista[c]	Vasco Winds[d]	Golden Hills[e]
American kestrel	0.59 (0.5902)	0.09	0.15	0.~~30~~28	0.17
Barn owl	0.24 (0.2145)	0.02	0.00	0.~~03~~02	0.~~06~~05
Burrowing owl	0.78 (0.7754)	0.84	–	0.~~05~~06	0.58
Golden eagle	0.08 (0.0807)	0.01	0.04	0.~~06~~04	0.~~13–0.15[f]~~15
Loggerhead shrike	0.19 (0.1879)	0.00	–	~~–~~0.02	0.~~07~~02
Prairie falcon	0.02 (0.0201)	–	0.00	~~–~~0.01	0.~~01~~02
Red-tailed hawk	0.44 (0.4391)	0.20	0.10	0.~~25~~21	0.64
Swainson's hawk	0.00	–	–	–	–
Tricolored blackbird[g]	–	–	–		0.~~02~~01
White-tailed ~~kite[g]~~kite[f]	–	–	–	–	0.02
All raptors	2.43 (2.4313)	1.21	0.31	0.64	1.74
All native non-raptors	4.50 (4.5046)	2.51	1.01	2.~~09~~04	5.~~38~~39

Notes: Fatality rates reflect annual fatalities per MW. "–" denotes that no fatalities were detected. "0.00" signifies that, although fatalities were detected, the rate is lower than two significant digits.

[a] Average of 2005–2011 bird years (as reported in Table 3.4-10 of the PEIR). The numbers in parenthesis are the estimates out to four significant digits that were used to calculate baseline mortality rates in the PEIR.

[b] Average of 2005–2009 bird years (as reported in Table 3.4-10 of the PEIR).

[c] Average of 3 years (2007–2009) (as reported in Table 3.4-10 of the PEIR).

[d] Average of 3 years as reported in Brown et al. 2016. Numbers in parentheses represent the change since the numbers reported in Table 3.4-10 of the PEIR.

[e] Average of 2 years as reported by H. T. Harvey & Associates (2018a, 2018b).

~~[f] As noted in H. T. Harvey & Associates (2018a:x), the estimates of golden eagle fatality rates varied between 0.07 and 0.13 bird/MW/year for the first year of monitoring, depending on the estimation method used. The authors noted that the more appropriate fatality rate estimate may be 0.09 bird/MW/year because of searcher efficiency and carcass persistence considerations. Consequently, the range of fatality rates reported for Golden Hills (as averaged over 2 years) is presented here for golden eagle.~~

[~~g~~f] Although tricolored blackbird and white-tailed kite have not been reported in prior studies, they are addressed here because tricolored blackbird has recently been listed under CESA and white-tailed kite is fully protected; and because both species have been reported as wind turbine fatalities.

Potential Biases in the Avian Fatality Analysis Methods

Several factors confound the comparison of avian fatality rates between old- and new-generation turbines. The fatality rates from nonrepowered turbines were obtained while management actions were being implemented to reduce avian fatalities. These actions included the shutdown of turbines during the winter period, a time when winds are lowest but avian use of the area is highest for three of the four focal species. In addition, hazardous turbines were being removed during the period of data collection. These actions in combination resulted in a reduction of avian fatality rates, tending to underestimate the differences between old-generation turbines and newer turbines because the newer turbines are not shut down during the winter period and none were deemed hazardous enough to warrant removal.

The fatality rates from three of the four repowered projects are associated with turbines that are considerably smaller than those likely to be used in all future repowering projects. ~~Evidence collected to date suggests that~~However, as discussed in the PEIR, avian fatality rates ~~may decrease as~~ are generally proportional to power generation capacity, which can be measured by the capacity rating of the turbine ~~size increases (Smallwood and Karas 2009). Consequently, these rates may be biased high relative to the turbines proposed for the Sand Hill Project.~~or by the rotor-swept area of the turbine. The PEIR used capacity to index fatality rates.

There is considerable variation in collision risk across the various topographies and geographies of the APWRA, presumably due in part to variations in abundance and use of these areas by different species. For example, burrowing owls were known to be abundant in the area around the Diablo Winds turbines when they were installed, and thus there is a relatively high rate (for new-generation turbines) of fatalities at these turbines. Conversely, no burrowing owl fatalities were detected in the Buena Vista project area in the 3 years of fatality monitoring after repowering. Thus, the fatality rates at the four repowered project sites may not be representative of the fatality rates likely to occur at other repowering project sites. Because of the variation between these projects, fatality rates from all four projects were used to provide a range in the estimates of total annual fatalities likely to occur as a result of repowering. Additionally, variation between survey years may be substantial. For example, the first-year fatality rate for red-tailed hawk (0.91 fatality/MW/year) at the Golden Hills project was more than twice that of the second-year fatality rate (0.37 fatality/MW/year) (H. T. Harvey & Associates 2018a, 2018b). The authors of the Golden Hills report, H. T. Harvey & Associates, did not offer a hypothesis for the substantial reduction in the fatality rate of red-tailed hawks observed during the second year; however, this difference illustrates the substantial variation that can occur even in a single study from year to year.

Finally, one of the biggest differences among all studies is variation in detection probability. *Detection probability* as used here refers to the probability that a turbine-related fatality is actually detected. There are various ways of measuring detection probability, the most common being the use of carcass placement trials to measure the rate at which carcasses are removed from the search area and the rate at which searchers detect carcasses given that they are still present. Detection probability varies among searchers, habitat types, seasons, years, and it can be influenced by other factors as well.

The Alameda County Avian Fatality Monitoring Program measured detection probabilities in only one year, and these probabilities were used to estimate the number of avian mortalities in all years of the study. If detection probability varies considerably across years, such variation can also confound to an unknown degree comparisons of fatality rates and estimates of total fatalities across projects. A review of the available reports indicates that some progress has been made toward a unified approach to detection probability. The final report for the Vasco Winds project (Brown et al. 2016) reported fatality rates adjusted for overall detection probability. The first-year report for the Golden Hills project reported fatality rates in several ways, but did not use a method that used overall detection probability. The authors of the first year Golden Hills report noted that the primary method used to estimate fatality rates (the Huso DS729 estimation method) may have skewed the estimates for golden eagles compared to other estimation methods presented in the report, noting “we think these latter estimates are closer to reality than the Huso DS729 estimate for golden eagles, because they do not inflate the estimate by incorporating searcher efficiency and carcass persistence parameters that represent medium/large birds as a group rather than eagles specifically” (H. T. Harvey & Associates 2018a:xii). The estimates presented for Golden Hills, using different estimators for different years, illustrate the variation in detection probability and the challenges and uncertainties surrounding estimates that can result from it.

Bat Fatality Analysis Methods

Fatality Rates

The assessment of bat species potentially at risk is based on a review of existing bat fatality data for the APWRA, species occurrence data in and around the program and Project areas, the current understanding of those species' susceptibility to fourth-generation turbine–related mortality, and known trends in bat fatalities at wind energy facilities in general.

Methods used to conduct the analysis were similar to those used to assess the potential impacts on avian species. The analysis for fatality rate at non-repowered facilities was based on that presented by Alameda County Community Development Agency (2014), except that one source for bat mortality information used in that analysis, Brown et al. (2013), erroneously reported overall bat fatality rates. Table 10 in Brown et al. (2013) reported adjusted fatality rates for bats in several ways, including using "national means" or "national averages" and several onsite trials with different size classes. As reported in that first-year monitoring report, the highest fatality rate was reported as 1.679 bats/MW/year considering the overall detection, otherwise known as the "big D" adjustment method. The PEIR used this fatality rate and an additional fatality rate from a nearby wind resource area to calculate estimated bat fatalities. By the time a final report was prepared addressing all 3 monitoring years (Brown et al. 2016), a mortality rate of 1.679 bats/MW/year was reported in Table 30 for year one considering national averages. However, the average mortality rate for 3 years using the "D" adjustment was actually 3.207 bats/MW/year. For this analysis, the corrected mortality rates from the final Vasco Winds report were used, i.e., a 3-year average of 3.207 bats/MW/year, which updates the methodology used in the PEIR analysis.

Fatality rate numbers for non-repowered facilities were compared to fatality rates recorded for the repowered facilities (Buena Vista, Golden Hills, and Vasco Winds; ICF 2019). The number of bat mortalities expected to result from repowering was based on the 417 MW and 450 MW cap alternatives for the APWRA, as well as mortalities attributable to the Sand Hill Project.

Potential Biases in the Bat Fatality Analysis Methods

As noted in analysis by the Alameda County Community Development Agency (2014), although the best available evidence was used to estimate the number of bat fatalities potentially resulting from implementation of the proposed Program and projects, there was more uncertainty in these estimates than there was for bird fatality estimates. Because the Alameda County Avian Fatality Program was not designed to count bats, the baseline mortality rate was likely underestimated. Moreover, because Vasco Winds is not representative of the entire Program area, the Alameda County Community Development Agency (2014) cautioned that extrapolation of results from this site to other areas should be interpreted with caution. Finally, the nearby Montezuma Hills Wind Resource Area, while sharing some land use characteristics (e.g., grazing), supports more dryland farming than the APWRA and has a different topographical profile.

More recent analyses identify some additional biases and issues to consider when reviewing the bat fatality analysis methods. While not specifically a bias, analysis by ICF (2019) confirms that the Alameda County Community Development Agency (2014) erroneously used a mortality rate from the Vasco Winds project first-year report that was later corrected or adjusted in the final Vasco

Winds report. Although the corrected mortality rate is still lower than the second rate used from the Montezuma Hills Wind Resource Area, this change essentially results in a narrower range of estimated fatalities by the Alameda County Community Development Agency (2014). Also, the Golden Hills monitoring program used scent-detection dogs to conduct fatality searches, the first and only project to use these methods to date. The authors of the Golden Hills report (H. T. Harvey & Associates 2018b) note that the use of scent-detection dogs as well as the shorter 7-day search interval "… clearly resulted in our detecting far greater numbers of bat fatalities than previously reported in the APWRA." The authors of the Golden Hills report also conclude that "… additional years of post-repowering data from different APWRA projects will be necessary before a confident assessment of the patterns and magnitudes of impacts on bats can be confidently assessed." Together, all these factors and biases illustrate the continued challenges associated with estimating bat fatalities for repowering projects.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the proposed Project would be considered to have a significant effect if it would result in any of the conditions listed below.

- A substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.
- A substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.
- A substantial adverse effect on state- or federally protected wetlands (e.g., marshes, vernal pools, coastal wetlands) through direct removal, filling, hydrological interruption, or other means.
- Substantial interference with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impedance of the use of native wildlife nursery sites.
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.

Impacts and Mitigation Measures

Project Impacts

Impacts on biological resources could occur as a result of Project construction, O&M activities, and decommissioning. The Project would primarily affect upland annual grassland habitat in the Project area. Proposed Project activities would result in a small amount of permanent and temporary impacts on state- and federally regulated aquatic resources. Special-status plant and wildlife species that occupy aquatic and upland habitats in the Project area could be directly or indirectly affected by Project activities. Wildlife species with similar habitat use (e.g., use similar habitat types, tree nesting species) were grouped in the impact discussions below. Mitigation measures that are incorporated from the PEIR are noted at the end of each impact discussion. In some instances, the PEIR measures may have been modified for applicability to the Project without altering the content of the measure.

Table 3.4-5 shows the permanent and temporary impacts of Project construction by land cover type. Each of the Project layouts would have similar impacts; the layout with the most extensive impacts was used to calculate effects. Table 3.4-6 shows the impacts on upland grassland habitat by Project component for construction and maintenance activities. Following the 35-year life of the Project, the components would be decommissioned and removed. Table 3.4-7 lists the activities and impacts associated with decommissioning the Project.

Overall, a small portion of the site—approximately 8% of the total area—would be disturbed during the construction phase of the Project. This area constitutes the total Project footprint. Less than 1% of the Project area would be disturbed during O&M activities over the life of the Project, and in 35 years, decommissioning activities would entail disturbance of less than 7% of the total area.

Table 3.4-5. Land Cover Impacts during Construction (acres)

Land Cover/Habitat Type	Permanent	Temporary	Total
Nonnative annual grassland	23.30	223.50	246.80
Developed/existing infrastructure[a]	NA	NA	NA
Alkali wetland/drainage	0.04	0.42	0.46
Vernal pool	0.00	0.00	0.00
Perennial wetland drainage	0.01	0.09	0.10
Pond	0.00	0.00	0.00
Ephemeral drainage	0.01	0.17	0.18
Canal (aqueducts)[b]	NA	NA	NA
Total	23.36	224.24	247.60

[a] The acreage of impacts on the developed/existing infrastructure land cover type was not calculated because it is not a biological resource.

[b] Surface impacts on canals are not anticipated; gen-tie lines would pass over or under the canal but would not directly contact it.

Table 3.4-6. Upland Grassland Habitat Impact Summary for Construction and Maintenance (acres)

Activity	Permanent Impact	Temporary Impact
Construction		
Power collection system installation	0.0	23.5
Gen-tie installation	0.0	8.6
Staging area installation	0.0	31.2
New access road[a]	11.2	8.2
Access road expansion[a]	7.8	24.2
Turbine foundation installation	2.6	108.3
Meteorological tower installation	0.2	3.5
Subtotal	21.8	207.5
Maintenance		
O&M work (1 acre every 5 years for 30 years)[b]	0.0	6.0
Total	21.8	213.5

[a] Existing access roads would be reused to the extent possible; however, some sections of new access road would be required.

[b] Although the operational period of the Project is expected to be up to 35 years, ground-disturbing O&M activities would only occur in operational years 5–30.

Table 3.4-7. Decommissioning Impacts on Upland Grassland Habitat (acres)

Decommissioning Activity	Permanent Restoration	Temporary Impact
Staging area	0.0	34.5
Power collection system removal[a]	0.0	0.1
Temporary access road expansion[b]	7.9	24.3
New access road removal	10.6	7.6
Turbine foundation removal	2.6	107.0
O&M facility removal	2.0	3.0
Substation removal	0.6	0.2
Total	23.7	176.7

Note: Project decommissioning would entail removal of various Project components and restoration of upland habitat following the operational life of the Project.

[a] The power collection system, including the gen-tie line, would be mostly buried and would be capped and abandoned in place. Only minor aboveground components would be removed during decommissioning.

[b] Temporary widening of access roads would be necessary to decommission and remove turbines.

Impact BIO-1: Potential for ground-disturbing activities to result in adverse effects on special-status plants or habitat occupied by special-status plants (less than significant with mitigation)

The Project has the potential to affect special-status plants that could occur in grassland and aquatic habitats in the Project area. Section 3.4.1 lists 20 special-status plants with a moderate to high potential to occur in the Project area. Three of these species—San Joaquin spearscale, caper-fruited tropidocarpum, and diamond-petaled California poppy—have been previously documented in or adjacent to the Project area.

Ground-disturbing activities associated with Project construction, maintenance, and decommissioning could result in adverse effects on special-status plants or their habitat. Direct effects include those effects where plants may be removed, damaged, or crushed (seedlings) by ground-disturbing activities, the movement or parking of vehicles, and the placement of equipment and supplies. Ground disturbance can kill or damage mature individuals or eliminate their habitat. Excavation alters soil properties and may create conditions unsuitable for the growth of some species or favor their replacement by other species. The roots of shrubs and other perennial species are susceptible to damage from soil compaction by equipment or construction materials. Possible indirect effects on plants could result from erosion that degrades habitat or accidental ignition of a fire that damages or kills individuals.

Because these ground-disturbing activities could have substantial adverse effects on special-status plant species, this impact would be significant. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact. Implementation of PEIR Mitigation Measures BIO-1a through BIO-1e would reduce this impact to a less-than-significant level. These measures would be effective in reducing impacts to a less than significant level because they would determine if special-status plants are present in the areas of proposed ground disturbance and, if any are present, implement practices to avoid the impacts where feasible or minimize the impacts if complete avoidance is not feasible. Where special-status plants could be avoided, the mitigation also requires protection of the special-status plants by training construction personnel and installing fencing or other barrier materials to ensure that construction equipment is excluded from the habitat occupied by special-status plants. A biological monitor would be required on-site during construction activities to ensure that the avoidance measures are complied with in the excluded areas. Where special-status plants could not be avoided, compensatory mitigation would ensure that the affected special-status plant species are preserved at one or more off-site locations. If no locations are available for preservation, the Project would be redesigned to avoid the plants.

No new mitigation measures are proposed.

PEIR Mitigation Measure BIO-1a: Conduct surveys to determine the presence or absence of special-status plant species

The Project proponent will conduct surveys for the special-status plant species within and adjacent to all Project sites. All surveys will be conducted by qualified biologists in accordance with the appropriate protocols.

Special-status plant surveys will be conducted in accordance with *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (California Department of Fish and Game 2009) during the season that special-status plant species would be evident and identifiable—i.e., during their blooming season. No more than 3 years prior to ground-disturbing repowering activities and during the appropriate identification periods for special-status plants (Table 3.4-2), a qualified biologist (as determined by Alameda County) will conduct field surveys within decommissioning work areas, proposed construction areas, and the immediately adjacent areas to determine the presence of habitat for special-status plant species. The Project proponent will submit a report documenting the survey results to Alameda County for review and approval prior to conducting any repowering activities. The report will include the location and description of all proposed work areas, the location and description of all suitable habitat for special-status plant species, and the location and description of other sensitive habitats (e.g., vernal pools, wetlands, riparian areas). Additionally, the report will outline where additional species and/or habitat-specific mitigation measures are required. This report will provide the basis for any applicable permit applications where incidental take of listed species may occur.

2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

The Project proponent will ensure that the following BMPs, in accordance with practices established in the EACCS, will be incorporated into the final Project design and construction documents.

- Employees and contractors performing ground-disturbing activities, including construction, decommissioning and reclamation functions will receive environmental sensitivity training. Training will include review of environmental laws, mitigation measures, permit conditions, and other requirements that must be followed by all personnel to reduce or avoid effects on special-status species and sensitive habitats during construction activities.
- Environmental tailboard trainings will take place on an as-needed basis in the field. These trainings will include a brief review of the biology of the covered species and guidelines that must be followed by all personnel to reduce or avoid negative effects on these species during decommissioning and reclamation activities. Directors, managers, superintendents, and the crew leaders will be responsible for ensuring that crewmembers comply with the guidelines.
- Vehicles and equipment will be parked on pavement, existing roads, and previously disturbed areas to the extent practicable.
- Off-road vehicle travel outside the Project footprint will be avoided, and minimized to the extent possible within the Project footprint.
- Material will be stockpiled only in areas that do not support special-status species or sensitive habitats.
- Grading will be restricted to the minimum area necessary.
- Prior to ground-disturbing activities in sensitive habitats, Project construction boundaries and access areas will be flagged and temporarily fenced during construction to reduce the potential for vehicles and equipment to stray into adjacent habitats.
- Vehicles or equipment will not be refueled within 100 feet of a wetland, stream, or other waterway unless a bermed and lined refueling area (i.e., a created berm made of sandbags or other removable material) is constructed.
- Erosion control measures will be implemented to reduce sedimentation in nearby aquatic habitat when activities are the source of potential erosion. Plastic monofilament netting (erosion control matting) or similar material containing netting will not be used at the Project. Acceptable substitutes include coconut coir matting or tackified hydroseeding compounds.
- Significant earth moving-activities will not be conducted in riparian areas within 24 hours of predicted storms or after major storms (defined as 1-inch of rain or more).

- The following will not be allowed at or near work sites for Project activities: trash dumping, firearms, open fires (such as barbecues) not required by the activity, hunting, and pets (except for safety in remote locations).

PEIR Mitigation Measure BIO-1c: Avoid and minimize impacts on special-status plant species by establishing activity exclusion zones

Where surveys determine that a special-status plant species is present in or adjacent to a Project area, direct and indirect impacts of the Project on the species will be avoided through the establishment of activity exclusion zones, within which no ground-disturbing activities will take place, including construction of new facilities, construction staging, or other temporary work areas. Activity exclusion zones for special-status plant species will be established around each occupied habitat site, the boundaries of which will be clearly marked with standard orange plastic construction exclusion fencing or its equivalent. The establishment of activity exclusion zones will not be required if no construction-related disturbances will occur within 250 feet of the occupied habitat. The size of activity exclusion zones may be reduced through consultation with a qualified biologist and with concurrence from CDFW based on site-specific conditions.

PEIR Mitigation Measure BIO-1d: Compensate for impacts on special-status plant species

The Project proponent will avoid or minimize temporary and permanent impacts on special-status plants that occur on the Project site and will compensate for impacts on special-status plant species. Although all impacts on large-flowered fiddleneck, diamond-petaled California poppy, and caper-fruited tropidocarpum will be avoided, impacts on other special-status plant species will be avoided to the extent feasible, and any unavoidable impacts will be addressed through compensatory mitigation.

Where avoidance of impacts on a special-status plant species is infeasible, loss of individuals or occupied habitat of a special-status plant species occurrence will be compensated for through the acquisition, protection, and subsequent management in perpetuity of other existing occurrences at a 2:1 ratio (occurrences impacted: occurrences preserved). The Project proponent will provide detailed information to the County and CDFW on the location of the preserved occurrences, quality of the preserved habitat, feasibility of protecting and managing the areas in-perpetuity, responsibility parties, and other pertinent information. <u>The preserved habitat will be confirmed to support populations of the impacted species and will be preserved in perpetuity via deed restriction, establishment of a conservation easement, or similar preservation mechanism. A qualified botanist or plant ecologist will prepare a Preservation Plan or Long-Term Management Plan for the site containing at a minimum: a monitoring plan and performance criteria for the preserved plant population; a description of remedial measures to be performed in the event that performance criteria are not met; a description of maintenance activities to be conducted on the site, including weed control, trash removal, irrigation, and control of herbivory by livestock and wildlife; and an adequate funding mechanism to ensure long-term management of the preserved habitat.</u> If suitable occurrences of a special-status plant species are not available for preservation, then the Project will be redesigned to remove features that would result in impacts on that species.

PEIR Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas

The Project proponents will retain a qualified biologist (as determined by Alameda County) to conduct periodic monitoring of decommissioning, repowering, and reclamation activities that occur adjacent to sensitive biological resources (e.g., special-status species, sensitive vegetation communities, wetlands). Monitoring will occur during initial ground disturbance where sensitive biological resources are present and weekly thereafter or as determined by the County in coordination with a qualified biologist. The biologist will assist the crew, as needed, to comply with all Project implementation restrictions and guidelines. In addition, the biologist will be responsible for ensuring that the Project proponent or its contractors maintain exclusion areas adjacent to sensitive biological resources, and for documenting compliance with all biological resource–related mitigation measures.

Impact BIO-2: Adverse effects on special-status plants and natural communities resulting from the introduction and spread of invasive plant species (less than significant with mitigation)

Construction activities have the potential to facilitate the introduction and spread of invasive nonnative plant species by removing vegetation and disturbing soils. Construction vehicles and machinery are primary vectors for the spread of such species. Control of the introduction and spread of invasive species is required for federal agencies under Executive Order 11312. The introduction and spread of invasive nonnative plant species as a result of activities associated with the program would constitute a significant indirect impact. However, implementation of 2019 Updated PEIR Mitigation Measure BIO-1b and PEIR Mitigation Measures BIO-2, BIO-5c, and WQ-1 would reduce this impact to a less-than-significant level.

These measures would be effective at reducing impacts to a less than significant level by implementing practices to keep new invasive species from being transported into the construction area and keep existing populations from spreading within the construction area. Erosion and sedimentation control measures, in conjunction with restoration plans, would encourage reestablishment of non-invasive plant species. For annual grassland habitats, a restoration plan would be developed to restore the soils and plant species in temporarily disturbed areas to original conditions and prevent future disturbance from continued use of temporary access roads after construction is completed. Monitoring of all restored areas would document that habitat restoration achieves specific success criteria. Implementation of a project SWPPP would ensure compliance with Clean Water Act Section 402 and would protect the restored vegetation from damage due to erosion or sedimentation while it becomes established.

No new mitigation measures are proposed.

2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

PEIR Mitigation Measure BIO-2: Prevent introduction, spread, and establishment of invasive plant species

To avoid and minimize the introduction and spread of invasive nonnative plant species, the Project proponent will implement the following BMPs.

- Construction vehicles and machinery will be cleaned prior to entering the construction area. Cleaning stations will be established at the perimeter of the construction area along all construction routes or immediately offsite.
- Vehicles will be washed only at approved areas. No washing of vehicles will occur at job sites.
- To discourage the introduction and establishment of invasive plant species, seed mixtures and straw used within natural vegetation will be either rice straw or weed-free straw, as allowed by state and federal regulation of stormwater runoff.

In addition, the Project proponent will prepare and implement erosion and sediment control plans to control short-term and long-term erosion and sedimentation effects and to restore soils and vegetation in areas affected by construction activities (2019 Updated PEIR Mitigation Measure BIO-1b and PEIR Mitigation Measure WQ-1). Prior to initiating any construction activities that will result in temporary impacts on natural communities, a restoration and monitoring plan will be developed for temporarily affected habitats in each Project area (PEIR Mitigation Measure BIO-5c). Restoration and monitoring plans will be submitted to the County and CDFW for approval. These plans will include methods for restoring soil conditions and revegetating disturbed areas, seed mixes, monitoring and maintenance schedules, adaptive management strategies, reporting requirements, and success criteria. Following completion of Project construction, the Project proponents will implement the revegetation plans to restore areas disturbed by Project activities to a condition of equal or greater habitat function than occurred prior to the disturbance.

PEIR Mitigation Measure BIO-5c: Restore disturbed annual grasslands

Within 30 days prior to any ground disturbance, a qualified biologist will prepare a Grassland Restoration Plan in coordination with CDFW and subject to CDFW approval, to ensure that temporarily disturbed annual grasslands and areas planned for the removal of permanent roads and turbine pad areas are restored to preproject conditions. The Grassland Restoration Plan will include but not be limited to the following measures.

- Gravel will be removed from areas proposed for grassland restoration.
- To the maximum extent feasible, topsoil will be salvaged from within onsite work areas prior to construction. Imported fill soils will be limited to weed-free topsoil similar in texture, chemical composition, and pH to soils found at the restoration site.
- Where appropriate, restoration areas will be seeded (hydroseeding is acceptable) to ensure erosion control. Seed mixes will be tailored to closely match that of reference site(s) within the program area and should include native or naturalized, noninvasive species sourced within the Project area or from the nearest available location.
- Reclaimed roads will be restored in such a way as to permanently prevent vehicular travel.

The plan will include a requirement to monitor restoration areas annually (between March and October) for up to 3 years following the year of restoration. The restoration will be considered successful when the percent cover for restored areas is 70% absolute cover of the planted/seeded species compared to the percent absolute cover of nearby reference sites. No more than 5% relative cover of the vegetation in the restoration areas will consist of invasive plant species rated as "high" in Cal-IPC's California Invasive Plant Inventory Database (http://www.cal-ipc.org). Remedial measures prescribed in the plan will include supplemental seeding, weed control, and other actions as determined necessary to achieve the long-term success criteria. Monitoring may be extended if necessary to achieve the success criteria or if drought conditions preclude restoration success. Other performance standards may also be required as they relate to special-status species habitat; these will be identified in coordination with CDFW and included in the plan. The Project proponent will provide evidence that CDFW has reviewed and approved the Grassland Restoration Plan. Additionally, the Project proponent will provide annual monitoring reports to the County by January 31 of each year, summarizing the monitoring results and any remedial measures implemented (if any are necessary) during the previous year.

PEIR Mitigation Measure WQ-1: Comply with NPDES requirements

Project contractors will obtain coverage under the Construction General Permit before the onset of any construction activities, because the Project would disturb 1 acre or more. A SWPPP will be developed by a qualified engineer or erosion control specialist in accordance with the appropriate Water Board's requirements for NPDES compliance and implemented prior to the issuance of any grading permit before construction. The SWPPP will be kept onsite during construction activities and will be made available upon request to representatives of the Regional Water Boards.

Compliance and coverage with the Storm Water Management Program and General Construction Permit will require controls of pollutant discharges that utilize BMPs and technology reduce erosion and sediments to meet water quality standards. BMPs may consist of a wide variety of measures taken to reduce pollutants in stormwater and other nonpoint-source runoff. Measures range from source control, such as reduced surface disturbance, to the treatment of polluted runoff, such as detention basins.

BMPs to be implemented as part of the *Storm Water Management Program* and Construction General Permit (and SWPPP) may include the following practices.

- Temporary erosion control measures (such as silt fences, staked straw bales/wattles, silt/sediment basins and traps, check dams, geofabric, sandbag dikes, and temporary revegetation or other ground cover) will be employed to control erosion from disturbed areas.
- Use a dry detention basin (which is typically dry except after a major rainstorm, when it will temporarily fill with stormwater), designed to decrease runoff during storm events, prevent flooding, and allow for off-peak discharge. Basin features will include maintenance schedules for the periodic removal of sediments, excessive vegetation, and debris that may clog basin inlets and outlets.
- Cover or apply nontoxic soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more) that could contribute sediment to waterways.
- Enclose and cover exposed stockpiles of dirt or other loose, granular construction materials that could contribute sediment to waterways.
- Ensure that no earth or organic material will be deposited or placed where it may be directly carried into a stream, marsh, slough, lagoon, or body of standing water.

- Prohibit the following types of materials from being rinsed or washed into the streets, shoulder areas, or gutters: concrete, solvents and adhesives, thinners, paints, fuels, sawdust, dirt, gasoline, asphalt and concrete saw slurry, and heavily chlorinated water.
- Ensure that grass or other vegetative cover will be established on the construction site as soon as possible after disturbance.

The contractor will select a combination of BMPs (consistent with Section A of the Construction General Permit) that is expected to minimize runoff and remove contaminants from stormwater discharges. The final selection of BMPs will be subject to approval by the San Francisco Bay Regional Water Board and the Central Valley Water Board.

The contractor will verify that a notice of intent has been filed with the State Water Board and that a SWPPP has been developed before allowing construction to begin. The contractor will perform inspections of the construction area, to verify that the BMPs specified in the SWPPP are properly implemented and maintained. The contractor will notify the appropriate Regional Water Board immediately if there is a noncompliance issue and will require compliance. If necessary, the contractor or their agent will require that additional BMPs be designed and implemented if those originally constructed do not achieve the identified performance standard.

Impact BIO-3: Potential mortality or loss of habitat for vernal pool branchiopods and curved-foot hygrotus diving beetle (less than significant with mitigation)

Based on the known presence of vernal pool fairy shrimp in the vicinity (within 1 mile of the Project area), it was determined that vernal pool fairy shrimp and vernal pool tadpole shrimp (collectively referred to as vernal pool branchiopods) may occur in all suitable habitat (alkali wetlands, ephemeral ponds, and vernal pool) within the Project area (Figures 3.4-1a–3.4-1c). Therefore, vernal pool branchiopods could be affected by Project activities that involve ground disturbance including installation of new facilities, maintenance activities, and decommissioning activities.

Curved-foot hygrotus diving beetle was addressed in the PEIR but was not addressed in the EACCS and is not considered a special-status species for purposes of this SEIR. This species could co-occur with vernal pool branchiopods and so potential effects described for vernal pool branchiopods would also apply to curved-foot hygrotus diving beetle.

Project features have been designed to avoid direct impacts on suitable habitat for vernal pool branchiopods (i.e., one vernal pool, five small seasonal ponds, and three small alkali wetlands). However, because some ground-disturbing activities associated with widening of access roads and installation of new turbine foundations and ancillary structures would be necessary near some of these aquatic features, such activities could indirectly affect vernal pool branchiopods by altering suitable habitat. Construction activities such as excavation, grading, and stockpiling of soil could result in the runoff of sediment, gasoline, oil, or other contaminants into nearby aquatic features, potentially resulting in degradation of water quality in suitable habitat, adversely affecting the survival potential of both the branchiopods and their food resources. The construction of new facilities or improvements to existing roads that impede or alter the flow of stormwater across the Project area could also reduce the suitability of vernal pool branchiopod habitat by altering the hydroperiod of those aquatic features.

Indirect effects associated with potential sediment and chemical runoff during construction would be avoided and minimized through implementation of construction BMPs requiring installation of sediment control devices and implementation of a spill response plan.

Direct and indirect impacts on vernal pool brachiopods would be significant because the Project could reduce the local populations of a federally listed species. Implementation of 2019 Updated PEIR Mitigation Measure BIO-1b and PEIR Mitigation Measures BIO-1e, BIO-5c, and BIO-3b would reduce this impact to a less-than-significant level. These measures would be effective in reducing impacts to a less than significant level because they restrict the type and timing of activities in the vicinity of suitable habitat for vernal pool brachiopods to minimize indirect effects and would retain a biological monitor to ensure that these measures are properly implemented during construction. Also, direct loss of habitat will be fully mitigated.

No new mitigation measures are proposed.

2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

PEIR Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas

PEIR Mitigation Measure BIO-3b: Implement measures to avoid, minimize, and mitigate impacts on vernal pool branchiopods and curved-footed hygrotus diving beetle

Where suitable habitat for listed vernal pool branchiopods and curved-footed hygrotus diving beetle are identified within 250 feet (or another distance as determined by a qualified biologist based on topography and other site conditions) of proposed work areas, the following measures will be implemented to ensure that the repowering projects do not have adverse impacts on listed vernal pool branchiopods or curved-footed hygrotus diving beetle. Additional conservation measures or conditions of approval may be required in applicable project permits (e.g., ESA incidental take permit).

- Avoid all direct impacts on sandstone rock outcrop vernal pools.
- Ground disturbance will be avoided from the first day of the first significant rain (1 inch or more) until June 1, or until pools remain dry for 72 hours and no significant rain is forecast on the day of such ground disturbance.
- If vernal pools, clay flats, alkaline pools, ephemeral stock tanks (or ponds), sandstone pools, or roadside ditches are present within 250 feet of the work area (or another appropriate distance as determined by a qualified biologist on the basis of topography and other site conditions), the biologist will stake and flag an exclusion zone prior to construction activities. The width of the exclusion zone will be based on site conditions and will be the maximum practicable distance that ensures protection of the feature from direct and indirect effects of the Project. Exclusion zones will be established around features whether they are wet or dry at the time. The exclusion zone will be fenced with orange construction zone and erosion control fencing (to be installed by construction crew).
- No herbicide will be applied within 100 feet of exclusion zones, except when applied to cut stumps or frilled stems or injected into stems. No broadcast applications will be allowed.
- Avoid modifying or changing the hydrology of aquatic habitats.
- Minimize the work area for stream crossings and conduct work during the dry season (June 1 through the first significant rain of the fall/winter).
- Install utility collection lines across perennial creeks by boring under the creek.

Where impacts cannot be avoided or minimized, compensatory mitigation will be undertaken in accordance with mitigation ratios and requirements developed under the East Alameda County Conservation Strategy. In the event that an incidental take permit is required, compensatory mitigation will be undertaken in accordance with the terms of the permit in consultation with USFWS.

Impact BIO-4: Potential disturbance or mortality of and loss of suitable habitat for valley elderberry longhorn beetle (no impact)

Elderberry shrubs, which are the host plants for valley elderberry longhorn beetle, do not occur in the Project area. Therefore, there is no suitable habitat for this species and there would be no impact on valley elderberry longhorn beetle as a result of project activities. No mitigation is required.

Impact BIO-5: Potential disturbance or mortality of and loss of suitable habitat for California tiger salamander, western spadefoot, California red-legged frog, and foothill yellow-legged frog (less than significant with mitigation)

Based on the presence of suitable aquatic and upland habitat for California tiger salamander and California red-legged frog within the Project area and known populations within and adjacent to the Project area, there is a potential for California tiger salamanders and California red-legged frogs to be affected by Project activities including, installation of new facilities, maintenance activities, and decommissioning activities.

While western spadefoots have not been previously documented within or near the Project area, this species occurs in similar aquatic and upland habitats as California tiger salamander and red-legged frog and could co-occur with these species. The Project area does not provide suitable habitat for foothill-yellow legged frog since there are no rocky, woodland streams that run through the Project area. The Project is not expected to have impacts on Foothill yellow-legged frogs.

Construction activities such as excavation, grading, and stockpiling of soil and materials could remove or otherwise alter suitable habitat for or result in injury or mortality of California tiger salamanders, California red-legged frogs, and western spadefoots. Potential direct effects include mortality or injury by equipment, entrapment in open trenches or other Project facilities, and entombment of animals in occupied burrows that are covered or filled in.

Based on the proximity of potential aquatic breeding habitat, all Project activities would be conducted within the dispersal range for California tiger salamanders, California red-legged frogs and western spadefoots, and would result in modification of potential upland habitat where new facilities, including access roads, are constructed. Project impacts on upland habitat associated with construction and maintenance activities and decommissioning activities are summarized in Tables 3.4-6 and 3.4-7, respectively. Project activities would have a minor impact on aquatic features in the Project area that provide suitable aquatic habitat for California red-legged frog. While construction activities would affect alkali wetlands/drainages and ephemeral drainages where California red-legged frogs may forage and disperse, their potential breeding habitat is primarily found in permanent and semi-permanent ponds and perennial wetland drainages. The Project would result in only a small amount (less than 1 acre) of permanent and temporary impacts on alkali wetland/drainage, ephemeral drainages, and perennial wetland drainage habitat as listed in Table 3.4-5. No permanent or temporary direct impacts on aquatic habitat for California tiger salamander (ponds and a vernal pool) are anticipated.

Indirect effects on California tiger salamander, California red-legged frog, and western spadefoot could result from construction-related ground-disturbing activities that degrade nearby aquatic breeding habitat. Exposed soil surfaces left unvegetated have the potential to lead to sedimentation of adjacent aquatic resources that may provide suitable breeding, foraging, and dispersal habitat for these species. Construction activities also have the potential to result in degradation of water quality in these habitats from runoff of petroleum-based products associated with equipment and vehicles used during construction. Because of the limited areal extent of impacts in relation to the size of the watershed, the Project is not expected to significantly increase the amount of impervious surface or to alter local hydrology.

Direct and indirect impacts on California tiger salamander, California red-legged frog, and western spadefoot would be significant because the Project could reduce the local populations of state and federally listed species. Implementation of 2019 Updated PEIR Mitigation Measures BIO-1b and BIO-5a, and PEIR Mitigation Measures BIO-1e, BIO-5b, and BIO-5c would reduce this impact to a less-than-significant level. These measures would be effective in reducing impacts to a less than significant level because they would minimize the potential for take by: restricting the timing of activities to avoid periods of increased above ground movements; requiring preconstruction surveys to clear areas of special-status amphibians before the start of construction; precluding animals from high risk areas by fencing active construction areas and covering open holes or trenches; allowing for animals to be relocated if found within the construction area; providing protection of adjacent aquatic breeding habitat by implementing construction BMPs to reduce indirect water quality impacts; and ensuring proper implementation of all protection measures by requiring an onsite biological monitor during ground-disturbing activities. Also, direct loss of habitat will be fully mitigated.

No new mitigation measures are proposed.

2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

PEIR Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas

2019 Updated PEIR Mitigation Measure BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians

All project proponents will ensure that BMPs and other appropriate measures, in accordance with measures developed for the EACCS, be incorporated into the appropriate design and construction documents. *Implementation of some of these measures will require that the project proponent obtain incidental take permits from USFWS (California red-legged frog and California tiger salamander) and from CDFW (California tiger salamander only) before construction begins.* Additional conservation measures or conditions of approval may be required in applicable project permits (e.g., ESA or CESA incidental take authorization). The applicant will comply with the State of California State Water Resources Control Board NPDES construction general requirements for stormwater.

- Ground-disturbing activities will be limited to dry weather between April 15 and October 31. No ground-disturbing work will occur during wet weather. Wet weather is defined as when there has been 0.25 inch of rain in a 24-hour period. Ground disturbing activities halted due to wet weather may resume when precipitation ceases and the National Weather

Service 72-hour weather forecast indicates a 30% or less chance of precipitation. No ground-disturbing work will occur during a dry-out period of 48 hours after the above referenced wet weather.

- Where applicable, barrier fencing will be installed around the worksite to prevent amphibians from entering the work area. Barrier fencing will be removed within 72 hours of completion of work. The need and location of barrier fencing will be identified by a qualified biologist in cooperation with the County and/or any applicable resource agencies with the purpose of protecting dispersing special-status amphibians.
- Before construction begins, a qualified biologist will locate appropriate relocation areas and prepare a relocation plan for special-status amphibians that may need to be moved during construction. The proponent will submit this plan to USFWS and CDFW for review a minimum of 2 weeks prior to the start of construction.
- A qualified biologist will conduct preconstruction surveys (i.e., visual surveys of the ground surface and areas within burrows visible from the surface) immediately prior to ground-disturbing activities (including equipment staging, vegetation removal, grading). The biologist will survey the work area and all suitable habitats within 300 feet of the work area. If individuals (including adults, juveniles, larvae, or eggs) are found, work will not begin until USFWS and/or CDFW is contacted to determine if moving these life-stages is appropriate. If relocation is deemed necessary, it will be conducted in accordance with the relocation plan. Incidental take permits are required for relocation of California tiger salamander (USFWS and CDFW) and California red-legged frog (USFWS). Relocation of western spadefoot and foothill yellow-legged frog requires a letter from CDFW authorizing this activity.
- No monofilament plastic will be used for erosion control.
- All Project activity will terminate 30 minutes before sunset and will not resume until 30 minutes after sunrise during the migration/active season from November 1 to June 15. Sunrise and sunset times are established by the U.S. Naval Observatory Astronomical Applications Department for the geographic area where the Project is located.
- Vehicles will not exceed a speed limit of 15 mph on unpaved roads within natural land cover types, or during offroad travel.
- Trenches or holes more than 6 inches deep will be provided with one or more escape ramps constructed of earth fill or wooden planks and will be inspected by a qualified biologist prior to being filled. Any such features that are left open overnight will be searched each day prior to construction activities to ensure no covered species are trapped. Work will not continue until trapped animals have moved out of open trenches.
- Work crews or the onsite biological monitor will inspect open trenches, pits, and under construction equipment and material left onsite in the morning and evening to look for amphibians that may have become trapped or are seeking refuge.
- If special-status amphibians are found in the work area during construction and cannot or do not move offsite on their own, a qualified biologist who is USFWS and/or CDFW-approved under a biological opinion and/or incidental take permit for the specific project, will trap and move special-status amphibians in accordance with the relocation plan.

Relocation of western spadefoot and foothill yellow-legged frog requires a letter permit from CDFW authorizing this activity.

PEIR Mitigation Measure BIO-5b: Compensate for loss of habitat for special-status amphibians

Where impacts on aquatic and upland habitat for special-status amphibians cannot be avoided or minimized, compensatory mitigation will be undertaken in accordance with mitigation ratios and requirements developed under the East Alameda County Conservation Strategy. In the event that take authorization is required, compensatory mitigation will be undertaken in accordance with the terms of the authorization in consultation with USFWS and/or CDFW.

PEIR Mitigation Measure BIO-5c: Restore disturbed annual grasslands

Impact BIO-6: Potential disturbance or mortality of and loss of suitable habitat for western pond turtle (less than significant with mitigation)

According to current Project design, all turbine components and work areas would be located outside suitable aquatic habitat for western pond turtle identified in the Project area (perennial wetland drainage and large perennial ponds). However, culvert replacement activities and installation of collection lines may affect a small amount of suitable aquatic habitat (approximately 0.1 acre of perennial wetland drainage). It is expected that if pond turtles are present in these habitats, they would voluntarily retreat from areas of human disturbance. Although impacts on pond turtles within aquatic habitats would likely be avoided, pond turtles or pond turtle nests in grasslands in proposed work areas near aquatic habitats could be affected by Project activities. Nests containing pond turtle eggs could be crushed or individuals could be injured or killed during movement of equipment or excavation and grading activities.

For similar reason discussed under Impact BIO-4 for California tiger salamander and California red-legged frog, indirect effects on western pond turtle could result from construction-related ground-disturbing activities that degrade nearby aquatic habitat.

Direct and indirect impacts on western pond turtle would be significant because the proposed Project could diminish the local population of western pond turtles and lower reproductive potential, contributing to the further decline of the species. Implementation of 2019 Updated PEIR Mitigation Measure BIO-1b, and PEIR Mitigation Measures BIO-1e and BIO-6 would reduce this impact to a less-than-significant level. These measures would be effective in reducing impacts to a less than significant level because they include surveys to identify if pond turtles are present in aquatic habitats in the construction work area so that a biologist can be present during construction to ensure that pond turtles are not directly impacted by construction activities. Also, construction BMPs would be implemented to minimize indirect effects to suitable aquatic habitat.

No new mitigation measures are proposed.

2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

PEIR Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas

PEIR Mitigation Measure BIO-6: Conduct preconstruction surveys for western pond turtle and monitor construction activities if turtles are observed

If it is determined through preconstruction surveys conducted pursuant to Mitigation Measure BIO-3a that suitable aquatic or upland habitat for western pond turtle is present within proposed work areas, the following measures, consistent with measures developed for the EACCS, will be implemented to ensure that the proposed project does not have a significant impact on western pond turtle.

- One week before and within 24 hours of beginning work in suitable aquatic habitat, a qualified biologist (one who is familiar with different species of turtles) will conduct surveys for western pond turtle. The surveys should be timed to coincide with the time of day and year when turtles are most likely to be active (during the cooler part of the day between 8 a.m. and 12 p.m. during spring and summer). Prior to conducting the surveys, the biologist should locate the microhabitats for turtle basking (logs, rocks, brush thickets) and determine a location to quietly observe turtles. Each survey should include a 30-minute wait time after arriving onsite to allow startled turtles to return to open basking areas. The survey should consist of a minimum 15-minute observation period for each area where turtles could be observed.
- If western pond turtles are observed during either survey, a biological monitor will be present during construction activities in the aquatic habitat where the turtle was observed. The biological monitor also will be mindful of suitable nesting and overwintering areas in proximity to suitable aquatic habitat and will periodically inspect these areas for nests and turtles.
- If one or more western pond turtles are found in the work area during construction and cannot or do not move offsite on their own, a qualified biologist will remove and relocate the turtle to appropriate aquatic habitat outside and away from the construction area. Relocation of western pond turtle requires a letter from CDFW authorizing this activity.

Impact BIO-7: Potential disturbance or mortality of and loss of suitable habitat for Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip (less than significant with mitigation)

San Joaquin coachwhips or Blainville's horned lizards could occur within grassland habitats throughout the Project area. Project impacts on upland grassland habitat associated with construction and maintenance activities and decommissioning activities are summarized in Tables 3.4-6 and 3.4-7, respectively. Construction activities that involve excavation and grading in grassland habitat could crush San Joaquin coachwhips or Blainville's horned lizards if they are present. Individuals could also become entrapped in pits or trenches if these features are left open overnight, or they could be inadvertently injured or killed during the movement of equipment or materials that the reptiles use for shade and refuge.

Direct impacts on San Joaquin coachwhips or Blainville's horned lizards would be significant because the proposed Project could diminish the local population of these species and lower reproductive potential, contributing to the further decline of the species. Implementation of 2019 Updated PEIR Mitigation Measure BIO-1b, and PEIR Mitigation Measures BIO-1e, BIO-5c, and BIO-7a would reduce this impact to a less-than-significant level. These measures would be effective in reducing impacts to a less than significant level because they would minimize the potential for take by: requiring preconstruction surveys to clear areas of special-status reptiles before the start of construction; minimizing ground disturbance and conducting vegetation removal in a manner to allow special-status reptiles time to move out of harm's way; precluding animals from high risk areas by fencing active construction areas where applicable; allowing for animals to be relocated if found within the construction area; and ensuring proper implementation of all protection measures by requiring an onsite biological monitor during ground-disturbing activities. Also, measures to restore temporarily disturbed annual grassland will reduce the amount of habitat modification from project activities.

No new mitigation measures are proposed.

2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

PEIR Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas

PEIR Mitigation Measure BIO-5c: Restore disturbed annual grasslands

PEIR Mitigation Measure BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles

Where suitable habitat for Blainville's horned lizard, Alameda whipsnake, or San Joaquin coachwhip is identified in proposed work areas, all project proponents will ensure that BMPs and other appropriate measures, in accordance with measures developed for the EACCS, be incorporated into the appropriate design and construction documents. Implementation of some of these measures will require that the project proponent obtain incidental take permits from USFWS and CDFW (Alameda whipsnake) before construction begins. Additional conservation measures or conditions of approval may be required in applicable project permits (i.e., ESA incidental take permit).

- A qualified biologist will conduct preconstruction surveys immediately prior to ground-disturbing activities (e.g., equipment staging, vegetation removal, grading) associated with the program. If any Blainville's horned lizards, Alameda whipsnakes, or San Joaquin coachwhips are found, work will not begin until they are moved out of the work area to a USFWS- and/or CDFW-approved relocation site. Incidental take permits from USFWS and CDFW are required for relocation of Alameda whipsnake. Relocation of Blainville's horned lizard and San Joaquin coachwhip requires a letter from CDFW authorizing this activity.
- No monofilament plastic will be used for erosion control.
- Where applicable, barrier fencing will be used to exclude Blainville's horned lizard, Alameda whipsnake, and San Joaquin coachwhip. Barrier fencing will be removed within 72 hours of completion of work.
- Work crews or an onsite biological monitor will inspect open trenches and pits and under construction equipment and materials left onsite for special-status reptiles each morning and evening during construction.
- Ground disturbance in suitable habitat will be minimized.

- Vegetation within the proposed work area will be removed prior to grading. Prior to clearing and grubbing operations, a qualified biologist will clearly mark vegetation within the work area that will be avoided. Vegetation outside the work area will not be removed. Where possible hand tools (e.g., trimmer, chain saw) will be used to trim or remove vegetation. All vegetation removal will be monitored by the qualified biologist to minimize impacts on special-status reptiles.
- If special-status reptiles are found in the work area during construction and cannot or do not move offsite on their own, a qualified biologist who is USFWS- and/or CDFW-approved under an incidental take permit for the specific project will trap and move the animal(s) to a USFWS and/or CDFW approved relocation area. Incidental take permits from USFWS and CDFW are required for relocation of Alameda whipsnake. Relocation of Blainville's horned lizard and San Joaquin coachwhip requires a letter from CDFW authorizing this activity

Impact BIO-8: Potential construction-related disturbance or mortality of special-status and non–special-status migratory birds (less than significant with mitigation)

The Project would result in the permanent loss and temporary disturbance of annual grassland that provides nesting and foraging habitat for many species of migratory birds, including several special-status species such as Swainson's hawk, white-tailed kite, northern harrier, loggerhead shrike, tricolored blackbird, and burrowing owl. Project impacts on upland grassland habitat associated with construction and maintenance activities and decommissioning activities are summarized in Tables 3.4-6 and 3.4-7, respectively. Vegetation removal, including initial site grubbing, has the potential to remove active migratory bird nests. Few if any trees or shrubs would be removed by the Project; however, grasslands and wetland vegetation have the potential to support ground-nesting bird species, including tricolored blackbird. Destruction or disturbance of active bird nests could result in the incidental loss of fertile eggs or nestlings. Human presence and noise generated during construction could also disturb birds and raptors nesting near construction activities, potentially leading to nest abandonment, disruption of feeding patterns, or forced fledging of young. Nearby nesting habitat could include ground vegetation, shrubs, trees, and existing structures (e.g., transmission towers/poles, buildings, and abandoned or non-working turbine parts).

Direct and indirect impacts on special-status and non-special-status migratory birds would be significant because the Project could diminish the local population of these species and lower reproductive potential, contributing to the further decline of the species. Loss of migratory bird eggs, young, or adults that results from construction activities could also violate the MBTA and provisions of the California Fish and Game Code. Implementation of 2019 Updated PEIR Mitigation Measures BIO-1b and BIO-8a, and PEIR Mitigation Measures BIO-1e and BIO-5c would reduce this impact to a less-than-significant level. These measures would be effective in reducing impacts to a less than significant level because they include surveys to identify active bird or raptor nests within species-specific buffer zones from active construction and establishment of no-activity zones to protect active nests until young have fledged.

No new mitigation measures are proposed; however, Mitigation Measure BIO-8a has been updated to note specific habitat requirements for nesting tricolored blackbirds, which should be considered during surveys. This update will help ensure avoidance of impacts to nesting colonies during construction, if any are present.

2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

PEIR Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas

PEIR Mitigation Measure BIO-5c: Restore disturbed annual grasslands

2019 Updated PEIR Mitigation Measure BIO-8a: Implement measures to avoid and minimize potential impacts on special-status and non–special-status nesting birds

Where suitable habitat is present for raptors within 1 mile (within 2 miles for golden eagles) and for tree/shrub- and ground-nesting migratory birds (non-raptors) within 50 feet (1,300 feet for tricolored blackbird) of proposed work areas, the following measures will be implemented to ensure that the proposed project does not have a significant impact on nesting special-status and non–special-status birds.

- Remove suitable nesting habitat (shrubs and trees) during the non-breeding season (September 1–January 31) for nesting birds.
- To the extent feasible, avoid construction activities in or near suitable or occupied nesting habitat during the breeding season of birds (generally February 1–August 31).
- If construction activities (including vegetation removal, clearing, and grading) will occur during the nesting season for migratory birds, a qualified biologist will conduct a preconstruction nesting bird surveys within 7 days prior to construction activities. The construction area and a 1-mile buffer will be surveyed for tree-nesting raptors (except for golden eagles), a ~~250~~ 500-foot buffer will be surveyed for northern harrier, and a 1,300-foot buffer will be surveyed for tricolored blackbird if potential tricolored blackbird nesting substrates are present (i.e., flooded, thorny, or spiny vegetation such as cattails, tules, willows, blackberries, thistles, or nettles), and a 50-foot buffer will be surveyed for all other bird species.
- Surveys to locate eagle nests within 2 miles of construction will be conducted during the breeding season prior to construction. A 1-mile no-disturbance buffer will be implemented for construction activities to protect nesting eagles from disturbance. Through coordination with USFWS, the no-disturbance buffer may be reduced to 0.5 mile if construction activities are not within line-of-sight of the nest.
- If an active nest (other than golden eagle) is identified near a proposed work area and work cannot be conducted outside the nesting season (February 1–August 31), a no-activity zone will be established around the nest by a qualified biologist in coordination with USFWS and/or CDFW. Fencing and/or flagging will be used to delineate the no-activity zone. To minimize the potential to affect the reproductive success of the nesting pair, the extent of the no-activity zone will be based on the distance of the activity to the nest, the type and extent of the proposed activity, the duration and timing of the activity, the sensitivity and habituation of the species, and the dissimilarity of the proposed activity to background activities. The no-activity zone will be large enough to avoid nest abandonment and will be between 50 feet and 1 mile from the nest, or as otherwise required by USFWS and/or CDFW.

PEIR Mitigation Measure BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl

Where suitable habitat for western burrowing owl is in or within 500 feet of proposed work areas, the following measures will be implemented to avoid or minimize potential adverse impacts on burrowing owls.

- To the maximum extent feasible (e.g., where the construction footprint can be modified), construction activities within 500 feet of active burrowing owl burrows will be avoided during the nesting season (February 1–August 31).
- A qualified biologist will conduct preconstruction take avoidance surveys for burrowing owl no less than 14 days prior to and within 24 hours of initiating ground-disturbing activities. The survey area will encompass the work area and a 500-foot buffer around this area.
- If an active burrow is identified near a proposed work area and work cannot be conducted outside the nesting season (February 1–August 31), a no-activity zone will be established by a qualified biologist in coordination with CDFW. The no-activity zone will be large enough to avoid nest abandonment and will extend a minimum of 250 feet around the burrow.
- If burrowing owls are present at the site during the non-breeding season (September 1–January 31), a qualified biologist will establish a no-activity zone that extends a minimum of 150 feet around the burrow.
- If the designated no-activity zone for either breeding or non-breeding burrowing owls cannot be established, a wildlife biologist experienced in burrowing owl behavior will evaluate site-specific conditions and, in coordination with CDFW, recommend a smaller buffer (if possible) and/or other measure that still minimizes disturbance of the owls (while allowing reproductive success during the breeding season). The site-specific buffer (and/or other measure) will consider the type and extent of the proposed activity occurring near the occupied burrow, the duration and timing of the activity, the sensitivity and habituation of the owls, and the dissimilarity of the proposed activity to background activities.
- If burrowing owls are present in the direct disturbance area and cannot be avoided during the non-breeding season (generally September 1 through January 31), burrowing owls may be excluded from burrows through the installation of one-way doors at burrow entrances. A burrowing owl exclusion plan, prepared by the project proponent, must be approved by CDFW prior to exclusion of owls. One-way doors (e.g., modified dryer vents or other CDFW approved method), which will be left in place for a minimum of 1 week and monitored daily to ensure that the owl(s) have left the burrow(s). Excavation of the burrow will be conducted using hand tools. During excavation of the burrow, a section of flexible plastic pipe (at least 3 inches in diameter) will be inserted into the burrow tunnel to maintain an escape route for any animals that may be inside the burrow. Owls will be excluded from their burrows as a last resort and only if other avoidance and minimization measures cannot be implemented.
- Avoid destruction of unoccupied burrows outside the work area and place visible markers near burrows to ensure that they are not collapsed.
- Conduct ongoing surveillance of the Project site for burrowing owls during Project activities. If additional owls are observed using burrows within 500 feet of construction, the onsite

biological monitor will determine, in coordination with CDFW, if the owl(s) are or would be affected by construction activities and if additional exclusion zones are required.

Impact BIO-9: Permanent and temporary loss of occupied habitat for western burrowing owl and foraging habitat for tricolored blackbird and other special-status and non–special-status birds (less than significant with mitigation)

Burrowing owls are likely to nest or winter in grasslands throughout the Project area. Project impacts on upland grassland habitat associated with construction and maintenance activities and decommissioning activities are summarized in Tables 3.4-6 and 3.4-7, respectively. Active burrowing owl burrows or refuge sites (i.e., culverts) could be permanently or temporarily lost from construction activities: excavation, grading, and culvert replacement. CDFW has determined on previous project that compensation is required for permanent loss of occupied burrowing owl habitat (i.e., where burrowing owls have been documented to occupy burrows in the preceding 3 years).

Permanent and temporary loss of grassland habitat would also reduce the available foraging habitat for burrowing owl, tricolored blackbird, and other special-status and non–special-status birds. Grassland habitat impacts are summarized in Tables 3.4-6 and 3.4-7. ~~Overall, the Project will permanently remove less 1 percent of the entire Project area.~~ Overall, the Project will permanently remove approximately 23 acres of annual grassland, which is less than 1 percent of the 2,600 acres of annual grassland in the entire Project area. The loss of less than 1 percent of available foraging habitat in the Project area is not expected to substantially reduce the availability of foraging habitat in the Project region and will not adversely affect special-status bird species. Up to 223 acres of annual grassland would be temporarily disturbed during Project construction; however implementation of PEIR Mitigation Measure BIO-5c would restore temporarily disturbed grasslands to pre-project conditions.

Permanent loss of occupied burrowing owl habitat could affect the local population and would be a significant impact; however, implementation of 2019 Updated PEIR Mitigation Measure BIO-1b and PEIR Mitigation Measures BIO-1e, BIO-5c, BIO-8b, and BIO-9 would reduce this impact to a less-than-significant level. These measures would be effective in reducing impacts to a less than significant level because they include surveys to identify occupied burrowing owl habitat within the construction work area and 500-foot buffer, establishment of no-activity zones, to protect occupied areas, restoration of annual grassland habitat, and compensation of permanent loss of grassland and occupied burrowing owl habitat. No new mitigation measures are proposed.

2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

PEIR Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas

PEIR Mitigation Measure BIO-5c: Restore disturbed annual grasslands

PEIR Mitigation Measure BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl

PEIR Mitigation Measure BIO-9: Compensate for the permanent loss of occupied habitat for western burrowing owl

If construction activities would result in the removal of occupied burrowing owl habitat (determined during preconstruction surveys described in PEIR Mitigation Measure BIO-8b), this habitat loss will be mitigated by permanently protecting mitigation land through a conservation easement or by implementing alternative mitigation determined through consultation with CDFW as described in its *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 2012:11–13). The project proponent will work with the CDFW to develop the compensation plan, which will be subject to County review and approval.

Impact BIO-10: Potential injury or mortality of and loss of habitat for San Joaquin kit fox and American badger (less than significant with mitigation)

Annual grassland habitat in the Project area provides potential dispersal and denning habitat for San Joaquin kit fox and American badger. Project impacts on upland grassland habitat associated with construction and maintenance activities and decommissioning activities are summarized in Tables 3.4-6 and 3.4-7, respectively.

Although the likelihood of occurrence for San Joaquin kit fox is very low because the species has not been detected in the vicinity in many years, dispersing San Joaquin kit foxes could travel through or den in the Project area at the time of construction, and individuals could be injured or killed if they are encountered in active work areas. Kit foxes could be killed by vehicle collision, could become entrapped in pits or trenches if they are left open overnight, and could be injured during the movement of equipment or materials that kit foxes may use as cover.

American badgers could occur within grassland habitats throughout the Project area. American badgers denning in or near active work areas could be killed or injured during excavation or grading activities and could become entrapped in pits or trenches if they are left open overnight.

Direct impacts on San Joaquin kit fox or American badger would be significant because the Project could diminish the local population of a state and federally listed species and a state species of special concern and lower reproductive potential, contributing to the further decline of these species. Implementation of 2019 Updated PEIR Mitigation Measure BIO-1b and PEIR Mitigation Measures BIO-1e, BIO-5c, BIO-10a, and BIO-10b would reduce this impact to a less-than-significant level. These measures would be effective in reducing impacts to a less than significant level because they include surveys to identify if potential San Joaquin kit fox or badger dens are in or near (within 200 feet) and establish exclusion zones and monitoring to ensure take is avoided. Also, measure to prevent inadvertent entrapment of animals will be implemented to minimize disturbance of individuals that may pass through the construction work area.

No new mitigation measures are proposed

2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

PEIR Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas

PEIR Mitigation Measure BIO-5c: Restore disturbed annual grasslands

PEIR Mitigation Measure BIO-10a: Implement measures to avoid and minimize potential impacts on San Joaquin kit fox and American badger

Where suitable habitat is present for San Joaquin fit fox and American badger in and adjacent to proposed work areas, the following measures, consistent with measures developed in the EACCS, will be implemented to ensure that proposed Project does not have a significant impact on San Joaquin kit fox or American badger. *Implementation of some of these measures will require that the Project proponent obtain incidental take permits from USFWS and CDFW (San Joaquin kit fox) before construction begins.* Implementation of state and federal requirements contained in such authorization may constitute compliance with corresponding measures in the PEIR.

- To the maximum extent feasible, suitable dens for San Joaquin kit fox and American badger will be avoided.
- All Project proponents will retain qualified approved biologists (as determined by USFWS) to conduct a preconstruction survey for potential San Joaquin kit fox dens (U.S. Fish and Wildlife Service 2011). Resumes of biologists will be submitted to USFWS for review and approval prior to the start of the survey.
- Preconstruction surveys for American badgers will be conducted in conjunction with San Joaquin kit fox preconstruction surveys.
- As described in U.S. Fish and Wildlife Service 2011, the preconstruction survey will be conducted no less than 14 days and no more than 30 days before the beginning of ground disturbance, or any activity likely to affect San Joaquin kit fox. The biologists will conduct den searches by systematically walking transects through the Project area and a buffer area to be determined in coordination with USFWS and CDFW. Transect distance should be based on the height of vegetation such that 100% visual coverage of the Project area is achieved. If a potential or known den is found during the survey, the biologist will measure the size of the den, evaluate the shape of the den entrances, and note tracks, scat, prey remains, and recent excavations at the den site. The biologists will also determine the status of the dens and map the features. Dens will be classified in one of the following four den status categories defined by USFWS (U.S. Fish and Wildlife Service 2011).
    - Potential den: Any subterranean hole within the species' range that has entrances of appropriate dimensions and for which available evidence is sufficient to conclude that it is being used or has been used by a kit fox. Potential dens include (1) any suitable subterranean hole; or (2) any den or burrow of another species (e.g., coyote, badger, red fox, ground squirrel) that otherwise has appropriate characteristics for kit fox use; or an artificial structure that otherwise has appropriate characteristics for kit fox use.
    - Known den: Any existing natural den or artificial structure that is used or has been used at any time in the past by a San Joaquin kit fox. Evidence of use may include historical records; past or current radiotelemetry or spotlighting data; kit fox sign such as tracks, scat, and/or prey remains; or other reasonable proof that a given den is being or has been used by a kit fox (USFWS discourages use of the terms *active* and *inactive* when referring to any kit fox den because a great percentage of occupied dens show no evidence of use, and because kit foxes change dens often, with the result that the status of a given den may change frequently and abruptly).
    - Known natal or pupping den: Any den that is used, or has been used at any time in the past, by kit foxes to whelp and/or rear their pups. Natal/pupping dens may be larger

with more numerous entrances than dens occupied exclusively by adults. These dens typically have more kit fox tracks, scat, and prey remains in the vicinity of the den, and may have a broader apron of matted dirt or vegetation at one or more entrances. A natal den, defined as a den in which kit fox pups are actually whelped but not necessarily reared, is a more restrictive version of the pupping den. In practice, however, it is difficult to distinguish between the two; therefore, for purposes of this definition either term applies.

- Known atypical den: Any artificial structure that has been or is being occupied by a San Joaquin kit fox. Atypical dens may include pipes, culverts, and diggings beneath concrete slabs and buildings.

Written results of the survey including the locations of any potential or known San Joaquin kit fox dens will be submitted to USFWS within 5 days following completion of the survey and prior to the start of ground disturbance or construction activities.

- After preconstruction den searches and before the commencement of repowering activities, exclusion zones will be established as measured in a radius outward from the entrance or cluster of entrances of each den. Repowering activities will be prohibited or greatly restricted within these exclusion zones. Only essential vehicular operation on existing roads and foot traffic will be permitted. All other repowering activities, vehicle operation, material and equipment storage, and other surface-disturbing activities will be prohibited in the exclusion zones. Barrier fencing will be removed within 72 hours of completion of work. Exclusion zones will be established using the following parameters.
  - Potential and atypical dens: A total of four or five flagged stakes will be placed 50 feet from the den entrance to identify the den location.
  - Known den: Orange construction barrier fencing will be installed between the work area and the known den site at a minimum distance of 100 feet from the den. The fencing will be maintained until construction-related disturbances have ceased. At that time, all fencing will be removed to avoid attracting subsequent attention to the den.
  - Natal/pupping den: USFWS will be contacted immediately if a natal or pupping den is discovered in or within 200 feet of the work area.
- Any occupied or potentially occupied badger den will be avoided by establishing an exclusion zone consistent with a San Joaquin kit fox potential burrow (i.e., four or five flagged stakes will be placed 50 feet from the den entrance).
- In cases where avoidance is not a reasonable alternative, limited destruction of potential San Joaquin kit fox dens may be allowed as follows.
  - Natal/pupping dens: Natal or pupping dens that are occupied will not be destroyed until the adults and pups have vacated the dens and then only after consultation with USFWS. Removal of natal/pupping dens requires incidental take authorization from USFWS and CDFW.
  - Known dens: Known dens within the footprint of the activity must be monitored for 3 days with tracking medium or an infrared camera to determine current use. If no kit fox activity is observed during this period, the den should be destroyed immediately to preclude subsequent use. If kit fox activity is observed during this period, the den will be monitored for at least 5 consecutive days from the time of observation to allow any

resident animal to move to another den during its normal activity. Use of the den can be discouraged by partially plugging its entrance(s) with soil in such a manner that any resident animal can escape easily. Only when the den is determined to be unoccupied will the den be excavated under the direction of a biologist. If the fox is still present after 5 or more consecutive days of monitoring, the den may be excavated when, in the judgment of the biologist, it is temporarily vacant, such as during the fox's normal foraging activities. Removal of known dens requires incidental take authorization from USFWS and CDFW.

- Potential dens: If incidental take permits have been received (from USFWS and CDFW), potential dens can be removed (preferably by hand excavation) by biologist or under the supervision of a biologist without monitoring, unless other restrictions were issued with the incidental take permits. If no take authorizations have been issued, the potential dens will be monitored as if they are known dens. If any den was considered a potential den but was later determined during monitoring or destruction to be currently or previously used by kit foxes (e.g., kit fox sign is found inside), then all construction activities will cease and USFWS and CDFW will be notified immediately.

- Nighttime work will be minimized to the extent possible. The vehicular speed limit will be reduced to 10 miles per hour during nighttime work.
- Pipes, culverts, and similar materials greater than 4 inches in diameter will be stored so as to prevent wildlife species from using these as temporary refuges, and these materials will be inspected each morning for the presence of animals prior to being moved.
- A representative appointed by the Project proponent will be the contact for any employee or contractor who might inadvertently kill or injure a kit fox or who finds a dead, injured, or entrapped kit fox. The representative will be identified during environmental sensitivity training (2019 Updated PEIR Mitigation Measure BIO-1b) and his/her name and phone number will be provided to USFWS and CDFW. Upon such incident or finding, the representative will immediately contact USFWS and CDFW.
- The Sacramento USFWS office and CDFW will be notified in writing within 3 working days of the accidental death or injury of a San Joaquin kit fox during Project-related activities. Notification must include the date, time, and location of the incident, and any other pertinent information.

PEIR Mitigation Measure BIO-10b: Compensate for loss of suitable habitat for San Joaquin kit fox and American badger

Where permanent impacts on habitat for San Joaquin kit fox and American badger cannot be avoided or minimized, compensatory mitigation will be undertaken in accordance with mitigation ratios and requirements developed under the EACCS (Appendix C4). In the event that incidental take permits are required for San Joaquin kit fox, compensatory mitigation will be undertaken in accordance with the terms of permits in consultation with USFWS and CDFW.

Impact BIO-11: Avian mortality resulting from interaction with wind energy facilities (significant and unavoidable)

The PEIR (Alameda County Community Development Agency 2014) used the following assessment method. Estimated annual fatalities for existing and repowered scenarios were calculated and presented, followed by a discussion and summary of impacts on individual species and groups of species. A similar approach was used for this analysis, with updates for new information as noted in Table 3.4-8. For each species or group:

- The number of fatalities that would have occurred at the nonrepowered turbines is presented.
- The mortality rates for each repowered project are extrapolated to the proposed Project to calculate an estimated number of fatalities for that rate.
- The magnitude of estimated change is presented as a percent change from baseline.
- For each species or groups of species, the number of estimated fatalities is presented based on an average of all the repowering projects completed to date, and based on a weighted average[3] of all the repowering projects to date.

The estimated changes associated with the Sand Hill Project are shown in Table 3.4-8. Discussion for each species or group is given following the table.

[3] The "weighted average" is calculated by considering each year of fatality monitoring for each wind energy facility in the calculations. For example, the Vasco Winds completed 3 years of fatality monitoring, and each is year is considered in the estimates. Using this method, projects with more monitoring years are given more "weight" compared to projects with fewer monitoring years.

Table 3.4-8. Estimated Annual Avian Fatalities for the Existing and Repowered Sand Hills Project Area (updated from Tables 3.4-13 and 3.4-14 in the PEIR)

	Estimated Annual Fatalities for the Sand Hill Wind Repowering Project[a]								
	Nonrepowered Sand Hill Project	Repowered Sand Hill Project Using Average Mortality rates from Comparable Projects							
		Diablo Winds[b]		Buena Vista[c]		Vasco Winds[d]		Golden Hills[e]	
Species	Average Annual Fatalities	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease	Average Annual Fatalities	% Decrease
American kestrel	85.3	13.0	85%	21.7	75%	~~40.5~~41.0	~~53~~52%	~~24.6~~23.8	~~71~~72%
Barn owl	34.7	2.9	92%	0.0	100%	3.2~~.9~~	~~92~~91%	~~8.~~7.6	~~75~~78%
Burrowing owl	112.7	121.4	-8%	0.0	100%	~~11.6~~8.1	~~90~~93%	83.~~8~~1	26%
Golden eagle	11.6	1.~~5~~4	88%	5.8	50%	~~7.2~~6.4	~~38~~45%	~~18.8-~~21.~~7[f]~~7	~~-63 to -88~~6%[f]
Loggerhead shrike	27.5	0.0	100%	0.0	100%	~~0.0~~3.5	~~100~~87%	~~10.1~~2.8	~~63~~90%
Prairie falcon	2.9	0.0	100%	0.0	100%	1.~~4~~3	~~50~~-55%	~~1.4~~2.5	~~50~~13%
Red-tailed hawk	63.6	28.9	55%	14.5	77%	30.3	52%	92.5	-45%
Tricolored blackbird	~~0.0~~NA[f]	0.0	~~0%~~NA[f]	0.0	~~0%~~NA[f]	~~2.9~~3.1	~~NA[g]~~NA[f]	~~2.9~~1.7	~~NA[g]~~NA[f]
White-tailed kite	~~0.0~~NA[f]	0.0	~~0%~~NA[f]	0.0	~~0%~~NA[f]	0.0	~~0%~~NA[f]	2.~~9~~5	~~NA[g]~~NA[f]
Swainson's hawk	0.5	0.0	100%	0.0	100%	0.0	100%	0.0	100%
All raptors	351.1	174.~~9~~8	50%	44.8	87%	~~92.5~~93.2	~~74~~73%	~~251.4~~250.7	28%
All native non-raptors	650.3	362.7	44%	~~146.0~~145.9	78%	~~294.8~~387.2	~~55~~40%	~~777.4~~778.1	-20%

Note: mortality rates reflect annual fatalities (95% confidence interval).

[a] All estimates based on an existing and proposed capacity of 144.5MW for the Sand Hill Project area.

[b] Diablo Winds mortality rates extrapolated to the Sand Hill Project area.

[c] Buena Vista mortality rates extrapolated to the Sand Hill Project area.

[d] Vasco Winds mortality rates extrapolated to the Sand Hill Project area. Estimates are based on the mortality rates from 2 additional years of monitoring completed since the PEIR was prepared, as reported in Brown et al. (2016).

[e] Golden Hills mortality rates were not available at the time the PEIR was prepared. Golden Hills mortality rates extrapolated to the Sand Hill Project area. Estimates are based on 2 years of monitoring as reported in H. T. Harvey & Associates (2018a, 2018b).

~~[f] The range of credible estimates for the Golden Hills project were used in this analysis to estimate average annual fatalities.~~

~~[g]~~[f] NA = not applicable: a percent decrease cannot be calculated because there were no fatalities reported at nonrepowered turbines.

There are many differences between the four repowered projects used to estimate potential fatalities for the proposed Project. These differences include site-specific characteristics, dates of construction and operations, methods used to estimate fatalities, turbines used, and perhaps other factors. One of these factors, the turbines used, can be addressed in the design of the proposed project. Avian fatalities occur when a bird in flight is injured or killed by a turbine. Birds fly at variable heights above the ground, and one reason why raptor fatalities are common in the APWRA is that foraging raptors often fly at heights that are within the rotor plane of operating turbines. This phenomenon was studied by Smallwood and Thelander (2004), who observed raptors foraging in the APWRA and recorded how high they flew relative to the ground surface. These flight heights were presented in the form of histograms detailing flight height observations for each of four raptor groups: golden eagle, red-tailed hawk, American kestrel, and all raptors. Based on this work, Smallwood and Thelander (2004) recommended that to minimize fatality risks, the minimum clearance between an operating turbine rotor and the ground surface should be at least 29 m.

The histograms presented by Smallwood and Thelander (2004) can be interpolated to calculate the proportion of observed raptor flights that occurred below any given height. For the recommended 29 m rotor-to-ground clearance, for instance, 53% of golden eagle flights were below this height, as well as 61% of red-tailed hawk flights, 97% of American kestrel flights, and 65% of flights for all raptors (Table 3.4-9). Also, approximately 10% of flights for each group except the American kestrel were above the rotor plane of the turbines, which extends to about 150 m above ground for the tallest turbines.

Table 3.4-9. Proportion of Raptor Flights Lower Than the Rotor-to-Ground Clearance of Turbines Used in Repowering Projects in the APWRA

Rotor-to-Ground Clearance	Raptor Group: Golden Eagle	Red-Tailed Hawk	American Kestrel	All Raptors	Repowering Project[a]
13m	36%	43%	75%	46%	Potential Sand Hill turbines
15.5m	39%	48%	83%	52%	Two lowest Buena Vista turbines
20m	45%	58%	96%	61%	Potential Sand Hill turbines
22m	47%	58%	96%	62%	Potential Sand Hill turbines
25.5m	51%	60%	97%	64%	Most Buena Vista turbines
26.5m	52%	60%	97%	64%	Diablo Winds
29m	53%	61%	97%	65%	Smallwood and Thelander (2004) recommendation
29.5m	53%	62%	97%	65%	Vasco Winds
30m	53%	62%	97%	65%	Golden Hills
31.5m	54%	63%	97%	66%	Potential Sand Hill turbines
35.5m	55%	64%	98%	67%	Tallest Buena Vista turbines

Note: Percentages in this table show the proportion of observed flights that were below the rotor-swept zone. All other observed flights were either within or above the rotor-swept zone.

[a] Turbines specified for the projects, and information sources, are as follows:

Sand Hill: turbines would have clearances of between 13 m and 31.5 m.

Buena Vista: 27 of 38 turbines have a 25.5 m clearance height, with 2 taller and 9 shorter turbines (County of Contra Costa 2005).

Diablo Winds: 31 turbines have a 26.5 m clearance, and 7 turbines have a 31.5 m clearance (WEST 2006).

Vasco Winds: All turbines have a 29.5 m clearance (Brown et al. 2016).

Golden Hills: All turbines have a 30 m clearance (H. T. Harvey & Associates 2018a).

Table 3.4-9 uses the histograms of Smallwood and Thelander (2004) to estimate the proportion of raptor flights that would occur below the rotors used at each of the four repowered projects, as well as the rotors used for the proposed project. The information in Table 3.4-9 leads to the following conclusions:

- Of the four repowered projects, turbines used at Vasco Winds and Golden Hills (and two of the Buena Vista turbines) have greater clearance than the Smallwood and Thelander (2004) recommendation. The turbines used at Diablo Winds, and most of those used at Buena Vista, have lower clearance than the recommendation.
- Comparisons of turbine clearances shown in Table 3.4-9 with fatality estimates shown in Table 3.4.8 do not show any consistent patterns. For instance, the two projects with the highest clearance heights also have the highest golden eagle fatalities, as well as the highest red-tailed hawk fatalities. This result does not suggest that rotor clearance height doesn't affect fatality rates, but it does suggest that the effect may be small compared to other factors that have not been elucidated and cannot be assessed in this analysis.
- The turbines being considered for use at Sand Hill span nearly the full range of clearances, from 13 m up to 31.5 m. The turbines used could all have a 13 m clearance, or could all have a 31.5 m clearance, or could be any combination of different heights. This analysis conservatively assumes that all turbines would have a 13 m clearance. In this scenario, the turbines would be much more likely to intercept the flight path of raptors, than is the case under any of the four repowering projects evaluated in Table 3.4-8, and it is thus very possible that fatality rates would exceed those listed for other repowering projects in Table 3.4-8. Conversely, if all turbines had a 31.5 m clearance, it is very possible that fatality rates would be lower than those predicted in Table 3.4-8 using data from other repowering projects.

Site grading may occur during turbine installation to build a pad upon which the turbine is erected. Grading typically has the effect of lowering the ground surface elevation by one to several meters. Foraging raptors do not compensate for this change by lowering their flight paths, so grading has the effect of reducing the rotor-to-ground clearance height. This effect was not documented for the four comparison repowering projects shown in Table 3.4-9, but in consideration of the small percentage differences attributable to differences of one to several meters in clearance height, the incremental effect of site grading, although adverse, is small.

In summary, the proposed project could use turbines with lower rotor-to-ground clearance than was recommended by Smallwood and Thelander (2004). This would be expected to result in higher fatality rates for raptors. Smallwood and Thelander (2004) did not consider any other species groups, so it is not possible to state whether this result would also occur for burrowing owls or non-raptors, but in general these species forage near the ground and would be at low risk during foraging.

American Kestrel

The fatality monitoring information available since the PEIR was published indicate the final Vasco Wind monitoring results (Brown et al. 2016) showed a slightly lower estimated mortality rate for American kestrel (0.28 fatality/MW/year) compared to the mortality rate reported in the PEIR (0.30 fatality/MW/year). The average mortality rate for the first 2 years of the Golden Hills project (H. T. Harvey & Associates 2018a, 2018b) was significantly lower than the nonrepowered rated reported in the PEIR (0.17 fatality/MW/year versus 0.59 fatality/MW/year). The PEIR stated that the 450

MW program could decrease annual fatalities of American kestrel by 31–79% relative to a non-repowered program, and that is consistent with the results of this analysis, which considers recently available fatality monitoring results from the Golden Hills and Vasco Winds projects. Consequently, the mortality estimates of the PEIR remain unchanged relative to the Project's potential effects on American kestrel.

As shown in Table 3.4-8, the proposed Project would be expected to result in an estimated 13–41 American kestrel fatalities per year—a ~~53~~52–85% decrease compared to nonrepowered rates. The calculated average and weighted average mortality rates across all repowering projects, applied to the proposed Project was 24.9 fatalities per year (a 71% decrease) to ~~23.1~~and 24.0 fatalities per year (a ~~73~~72% decrease), respectively.

Summary: The PEIR concluded that repowering would result in significant and unavoidable impacts associated with avian mortality, although it anticipated that mortality rates may decrease with the transition from old-generation to new-generation turbines. This conclusion was based on combined estimates of avian mortality from three different repowering projects in the APWRA, given as a rate of bird deaths per MW per year, in various combinations of species (all raptor species, each of eight individual raptor species, and all native non-raptor species). These estimates indicated reductions of 32–83% in raptor fatalities (e.g., 31–79% fewer American kestrel fatalities for buildout of 450 MW in the APWRA). The PEIR acknowledged, however, that the avian mortality estimates were uncertain, stating that: "… while repowering is intended to reduce fatalities, enough uncertainty remains in light of project- and site-specific data to warrant a conservative approach in the impact analysis. Accordingly, the continued or increased loss of birds (including special-status species) *at a rate potentially greater than the existing baseline fatality rates* is considered a significant and unavoidable impact" [emphasis added] (Alameda County Community Development Agency 2014:3.4-103).[4]

The PEIR recognized the uncertainty of its avian mortality estimates, as well as the consideration of inter-annual and inter-project variation in mortality rates, and concluded that mortality rates under the 450 MW repowering program could exceed baseline, nonrepowered mortality rates (Alameda County Community Development Agency 2014). More specifically, while the PEIR used the "best available" data from three repowering projects to estimate a possible reduction of fatalities under the repowering program, the PEIR's impact conclusion for the 450 MW repowering program expressly acknowledged the uncertainty inherent in such data.

Thus, while the PEIR presented mortality estimates that looked promising, those estimates were uncertain and ultimately were not relied upon as the basis for its impact conclusion. The PEIR concluded that more data were needed: "[p]ostconstruction monitoring, once the turbines are in operation, will provide data to quantify the actual extent of change in avian fatalities from

[4] Similar statements are repeated throughout the PEIR; see page 3.4-121:

> As described above, for all avian focal species analyzed, a fully repowered program area would be expected to reduce estimated fatality rates. However, fatalities would still be expected to result from the operation of the repowered turbines, and uncertainty surrounding the accuracy of the estimated fatality rates and the types of species potentially affected remains. Considering this information, and despite the anticipated reductions in avian impacts compared to the baseline rates, the County has determined to use a conservative approach for the impact assessment, concluding that turbine related fatalities could constitute a substantial adverse effect on avian species because the rates for some or all of the species could be greater than the baseline rates. This impact would be significant. Implementation of Mitigation Measures BIO-11a through BIO-11i would reduce this impact, but not to a less-than-significant level; accordingly, this impact is considered significant and unavoidable.

repowering and the extent of avian fatality for projects in the program area …" (Alameda County Community Development Agency 2014:3.4-119). In light of this uncertainty, the PEIR required adaptive management for any repowering project where "… fatality monitoring … results in an estimate that exceeds the preconstruction baseline fatality estimates (i.e., estimates at the nonrepowered turbines as described in this PEIR) … to ensure that the best available science is used to minimize impacts to below baseline" (Alameda County Community Development Agency 2014:3.4-116).

While the PEIR set forth multiple measures to address avian mortality, it concluded that these measures would not reduce the impact to a less-than-significant level. This conclusion holds true for the Project, and, although it remains difficult to estimate mortality rates with certainty, continued monitoring would contribute to the body of knowledge informing this effort.

Implementation of PEIR Mitigation Measures BIO-11a through BIO-11i would reduce significant impacts on American kestrel but not to a less-than-significant level.

Barn Owl

The fatality monitoring information available since the PEIR was published indicate the final Vasco Wind monitoring results (Brown et al. 2016) were in line with the results of monitoring at Diablo Winds (0.02 fatality/MW/year) reported in PEIR, while the Golden Hills mortality rate was slightly higher (0.06 barn owl fatality/MW/year). The PEIR estimated that the 450 MW repowering program could decrease annual fatalities of barn owl by 81–89%, consistent with the results of this analysis, which considers the recently available fatality monitoring results from the Golden Hills and Vasco Winds projects. Consequently, the mortality estimates of the PEIR remain unchanged relative to the Project's potential effects on barn owl.

As shown in Table 3.4-8, the proposed Project would be expected to result in an estimated 3–~~9~~8 barn owl fatalities per year—a ~~75–92~~78–100% decrease compared to nonrepowered rates. The PEIR noted that barn owl populations are stable to possibly declining in the state and that it was uncertain what effect repowering may have on local barn owl populations. The PEIR also noted that the higher RSA of repowered turbines may reduce the risk of turbine collision because barn owls typically hunt in low quartering flights at about 1.5–4.5 meters (5–15 feet) above the ground. The proposed Project is generally consistent with the higher RSA of the recent Vasco Winds and Golden Hills projects, with rotor heights of 13–22 meters (43–75 feet) above the ground, depending on the make and model of turbine selected. The calculated average and weighted average mortality rates across all repowering projects, applied to the proposed Project was 3.~~6~~4 fatalities per year (a 90% decrease) ~~to~~and 3.~~1~~0 (a 91~~%)~~% decrease) fatalities per year, respectively.

Considering the fatality monitoring information available since the PEIR was published, the final Vasco Wind monitoring results (Brown et al. 2016) were in line with the results of monitoring at Diablo Winds (0.02 barn owl fatality/MW/year) reported in PEIR, while the Golden Hills mortality rate was slightly higher (0.06 barn owl fatality/MW/year). The PEIR estimated that the overall program could decrease annual fatalities of barn owl by 81–89%, consistent with the results of this analysis, which considers the recently available fatality monitoring results from the Golden Hills and Vasco Winds projects. Consequently, the mortality estimates of the PEIR remain unchanged relative to the Project's potential effects on barn owl.

Summary: The summary analysis for American Kestrel is applicable for the barn owl. Implementation of PEIR Mitigation Measures BIO-11a through BIO-11i would reduce significant impacts on barn owl but not to a less-than-significant level.

Burrowing Owl

The fatality monitoring information available since the PEIR was published indicate the final Vasco Wind monitoring results (Brown et al. 2016) resulted in a slightly higher estimated mortality rate for burrowing owl (0.06 fatality/MW/year) than the rate reported in the PEIR (0.05 fatality/MW/year). The average mortality rate for the first 2 years of the Golden Hills project (H. T. Harvey & Associates 2018a, 2018b) was significantly higher than the rate reported in the PEIR (0.58 fatality/MW/year); however, it was still less than the rates reported in the PEIR for Diablo Winds (0.84 fatality/MW/year) and nonrepowered turbines (0.78 fatality/MW year). The PEIR stated that the 450 MW program could decrease annual burrowing owl fatalities by 91% or could increase them by 48% compared to nonrepowered rates at 329 MW of installed capacity. The potential reductions or increases in fatalities described in the PEIR are nearly identical to the results of this analysis. This information, when considered in the context of the additional information on background mortality, suggests that effects on burrowing owls may be similar to those described in the PEIR.

As shown in Table 3.4-8, the proposed Project would be expected to result in an estimated ~~12~~0–121 burrowing owl fatalities per year—a change ranging from a ~~92~~100% decrease to an 8% increase, compared to nonrepowered rates. The calculated average and weighted average mortality rates across all repowering projects applied to the Sand Hill Project was 53.~~5~~1 fatalities per year (a 53% decrease) ~~to 61.6~~and 56.3 fatalities per year (a ~~45~~50% decrease), respectively.

The PEIR noted that "A growing body of circumstantial evidence indicates that many of the burrowing owl fatalities found during fatality surveys are due to predation rather than turbine collision." It concluded that "… the potential reduction in turbine-related burrowing owl fatalities may be underestimated because of the inability to distinguish fatalities resulting from predation from those caused by turbine collision." Just after the PEIR was published, the Alameda County avian monitoring team, with approval of the Scientific Review Committee, began a study of background mortality (ICF 2016). The study was prompted by the finding that substantial numbers of small bird carcasses—including burrowing owls—continued to accumulate in the search area around turbines during the period of seasonal shutdown, even though turbines were not operating (ICF 2016). Overall, the study reported that the patterns were relatively clear for small birds potentially subject to predation, but they were not as clear for burrowing owls. The authors of the study noted that California was in the fourth year of a historic drought, and anecdotal information suggested that the burrowing owl population was rapidly declining. Additionally, as H. T. Harvey & Associates (2018b) noted in their recent monitoring report for the Golden Hills project "… the fact that 84% of the Year 2 burrowing owl fatalities were found as feather spots or carcass remnants, mostly around burrows and along erosion-control wattles, suggests that predation was the primary cause of fatalities for this species…." Thus, uncertainty still remains surrounding burrowing owl mortality rates.

The PEIR stated that the overall program could decrease annual fatalities of burrowing owl by 91% or could increase them by 48%. The potential reduction in fatalities described in the PEIR is nearly identical to the results of this analysis. However, this analysis demonstrates a lower potential increase in burrowing owl fatalities (8%) than the PEIR (48%). This information, when considered in the context of the additional information on background mortality, suggests that effects on burrowing owls may be reduced from those described in the PEIR.

Summary: The summary analysis for American kestrel is applicable for the burrowing owl. Implementation of PEIR Mitigation Measures BIO-11a through BIO-11i would reduce significant impacts on burrowing owl but not to a less-than-significant level.

Golden Eagle

The fatality monitoring information available since the PEIR was published indicate the final Vasco Wind monitoring results (Brown et al. 2016) showed a slightly higher estimated mortality rate for golden eagle (0.06 fatality/MW/year) than the rate reported in the PEIR (0.03 fatality/MW/year). The average mortality rate for the first 2 years of the Golden Hills project (0.013–0.15 fatality/MW/year depending on the estimation method used) was significantly higher than the rate reported in the PEIR (H. T. Harvey & Associates 2018a, 2018b). The PEIR stated that the 450 MW program could decrease annual golden eagle fatalities by 32–83% relative to a non-repowered program. The additional monitoring results from Vasco Winds support this determination, while the Golden Hills monitoring results do not. As noted in Table 3.4-8, there is some uncertainty regarding the appropriate mortality rate; however, the Golden Hills mortality rates are generally higher than those of other recent repowering projects. Consequently, although the updated results from some previous repowering projects, such as the updated Vasco Winds results, indicate that repowering does reduce golden eagle fatalities, as has been observed during the majority of monitoring studies and years, the recent results at the Golden Hills project renders the outcome of repowering less clear for this species than was indicated in the PEIR, although average estimates across projects, both standard and weighted, still suggest a reduction. At this point, the predictors of high-versus low-level golden eagle mortality rates at a given wind project remain unknown.

As shown in Table 3.4-8, the proposed Project would be expected to result in between 1–22 fatalities per year~~ and 1–19 fatalities per year~~, depending on the fatality estimation methods used—from an 88% decrease to an ~~86~~87% increase, compared to nonrepowered rates. The calculated average and weighted average mortality rates across all repowering projects, applied to the Sand Hill Project was 8.~~3~~8 fatalities per year (a ~~28~~24% decrease) ~~to 6.3~~and 7.1 fatalities per year (a ~~46~~39% decrease), respectively.

Unlike other species addressed in this analysis, the golden eagle within the APWRA has been the subject of extensive field studies and models to ascertain its population status and its likely long-term responses to fatalities caused by wind energy developments. This work was synthesized by Hunt et al. (2017), who estimated that the annual reproductive output of 216–255 breeding pairs would have been necessary to support published estimates of 55–65 turbine-caused fatalities per year in the APWRA, concluding that the area has “a stable breeding population, but one for which any further decrease in vital rates would require immigrant floaters [subadults and nonbreeding adults] to fill territory vacancies.” This estimate would indicate that the 280 territorial pairs present in the Diablo Range (Wiens et al. 2015) would likely be adequate to maintain the region’s golden eagle population, but with a long-term population reductions possible if further turbine-caused fatalities were to occur. There are substantial uncertainties in this conclusion, though. USFWS notes that the severe drought that affected the Diablo Range during 2014-2016 monitoring resulted in average annual productivity approximately half of that assumed by Hunt et al. (2017), indicating that during times of low productivity a much larger population would be needed to achieve a stable population size under the stress of wind project mortality (USFWS 2019). Also, the work of Hunt et al. (2017) assumes that the Diablo Range eagles are a discrete population, but they acknowledge that up to 17% of radio transmitter-tagged eagles used in their study left the Diablo Range area or may have originated outside the area and migrated in. These “travelers” are predominately juvenile, subadult, or nonbreeding adult eagles, a group which also comprises a disproportionate fraction of the golden eagle mortalities in the APWRA. Thus the eagles in the APWRA make up an anomalously small fraction of the reproductive eagles in the Diablo Range, as well as an anomalously large fraction of those eagles most likely to have come from or be migrant to areas outside the Diablo Range.

Summary: The summary analysis for American kestrel is applicable for the golden eagle. Implementation of PEIR Mitigation Measures BIO-11a through BIO-11i would reduce significant impacts on golden eagle but not to a less-than-significant level. The proposed project may affect the Local Area Population at its current size; this risk is greatest when the population experiences other stressors as well, such as drought.

Loggerhead Shrike

The PEIR noted that no documented fatalities of loggerhead shrikes had occurred at any of the repowered projects in the APWRA at the time the PEIR was prepared. The final 2 years of monitoring at Vasco Winds did not result in any documented loggerhead shrike fatalities. The recent Golden Hills project documented a single fatality of this species, resulting in an estimated mortality rate of 0.~~07~~02 fatality/MW/year for that project, a reduction from the nonrepowered mortality rate provided in the PEIR (0.19 fatality/MW/year). The PEIR noted that the lack of documented fatalities suggests that there may be a reduced level of fatality from repowered turbines. The recent Golden Hills monitoring results, which documented a single fatality, also support the conclusion that repowering may reduce fatalities compared to nonrepowered baseline rates. Consequently, the conclusions of the PEIR remain unchanged relative to the Project's potential effects on loggerhead shrike.

As shown in Table 3.4-8, the proposed Project would be expected to result in an estimated 0–~~10~~4 loggerhead shrike fatalities per year~~—up to~~ a ~~63~~87-100% decrease relative to a non-repowered program. The calculated average and weighted average mortality rates across all repowering projects, applied to the Sand Hill Project was ~~2.5 fatalities per year (a 91% decrease) to~~ 1.6 fatalities per year (a 94% decrease) and 1.3 fatalities per year (a 95% decrease), respectively.

Summary: The summary analysis for American Kestrel is applicable for the loggerhead shrike. Implementation of PEIR Mitigation Measures BIO-11a through BIO-11i would reduce significant impacts on loggerhead shrike but not to a less-than-significant level.

Prairie Falcon

The fatality monitoring information available since the PEIR was published show one prairie falcon fatality, in the third year of Vasco Wind monitoring (Brown et al. 2016); this resulted in an average mortality rate of 0.01 fatality/MW/year. A single prairie falcon was recorded "on-plot" as a documented fatality in the second year of the Golden Hills project (H. T. Harvey & Associates 2018b), also resulting in an average mortality rate of 0.01 fatality/MW/year. Both mortality rates are half the nonrepowered rate provided in the PEIR (0.02 fatality/MW/year). The PEIR noted that fatality estimates at repowered sites were not available because no fatalities had been documented at repowered turbines at the time the PEIR was prepared. The PEIR also concluded that a lack of documented fatalities suggests that there may be a reduced level of fatality from repowered turbines, as well as a potentially lower risk to this species. The recent Vasco Winds and Golden Hills monitoring results support this conclusion.

As shown in Table 3.4-8, the proposed Project would be expected to result in zero to slightly more than 1 fatality per year—a ~~50~~13–100% decrease compared to nonrepowered rates. The calculated average and weighted average mortality rates across all repowering projects, applied to the Sand Hill Project was 1.0~~.~~ fatalities per year (a 67% decrease) and 0.7 fatalities per year (a ~~76% decrease) to 0.6 fatalities per year (a 79~~74% decrease), respectively.

Summary: The summary analysis for American kestrel is applicable for the prairie falcon. Implementation of PEIR Mitigation Measures BIO-11a through BIO-11i would reduce significant impacts on prairie falcon but not to a less-than-significant level.

Red-Tailed Hawk

The fatality monitoring information available since the PEIR was published indicate the final Vasco Wind monitoring results (Brown et al. 2016) resulted in a slightly lower estimated mortality rate for red-tailed hawk (0.21 fatality/MW/year) than the mortality rate reported in the PEIR (0.25 fatality/MW/year). The average mortality rate for the first 2 years of the Golden Hills project (H. T. Harvey & Associates 2018a, 2018b) was significantly higher than the rate reported in the PEIR (0.64 fatality/MW/year). The PEIR stated that the overall program could decrease annual fatalities of red-tailed hawks by 23–69% compared to nonrepowered rates at 329 MW of installed capacity. The additional monitoring results from Vasco Winds support this determination, while the Golden Hills monitoring results do not. Reviewing the Golden Hills monitoring results further, the first-year mortality rate for red-tailed hawk (0.91 fatality/MW/year) was more than twice as high as the second-year mortality rate (0.37 fatality/MW/year). The authors of the Golden Hills report, H. T. Harvey & Associates (2018a:xi), noted that results for red-tailed hawk may have been skewed by perching and nesting opportunities created by nearby old turbines. The second-year report did not discuss this factor further, although the removal of old generation turbines, which is ongoing in the APWRA, may have had an effect on the second-year mortality rate. Consequently, the recently available information suggests that although reductions in red-tailed hawk fatalities from repowering have been observed during the majority of monitoring studies and years, the outcome of repowering is less clear for this species than was indicated in the PEIR, although average estimates across projects, both standard and weighted, still suggest a reduction.~~ The final year of monitoring at the Golden Hills project may provide additional insight into these effects.~~

As shown in Table 3.4-8, the proposed Project would be expected to result in an estimated ~~15~~14–93 red-tailed hawk fatalities per year—from a 77% decrease to a 45% increase compared to nonrepowered rates. The calculated average and weighted average mortality rates across all repowering projects, applied to the Sand Hill Project was 41.5 fatalities per year (a 35% decrease) ~~to 35.7~~and 36.2 fatalities per year (a ~~44~~43% decrease), respectively.

Summary: The summary analysis for American kestrel is applicable for the red-tailed hawk. Implementation of PEIR Mitigation Measures BIO-11a through BIO-11i would reduce significant impacts on red-tailed hawk but not to a less-than-significant level.

Swainson's Hawk

As noted in the PEIR, there is only one recorded Swainson's hawk fatality in the APWRA (in an area of nonrepowered turbines), resulting in an annual estimated mortality rate of approximately zero (Table 3.4-8). No Swainson's hawk fatalities have been detected at Diablo Winds, Buena Vista, Vasco Winds, or Golden Hills. Based on the low (effectively zero) estimated mortality rate from nonrepowered sites, the lack of fatalities detected at repowered sites, and the relatively low number of detections during avian use surveys conducted by the County's avian fatality monitoring team, it is expected that the mortality rate for Swainson's hawk would remain at or near zero at the Project. The PEIR concluded that adverse effects on the local Swainson's hawk population were unlikely to occur, and recently available information supports this conclusion with regard to the proposed Project.

Summary: The summary analysis for American kestrel is applicable for the Swainson's hawk. Implementation of PEIR Mitigation Measures BIO-11a through BIO-11i would reduce significant impacts on Swainson's hawk but not to a less-than-significant level.

Tricolored Blackbird

At the time the PEIR was prepared, tricolored blackbird had not been recorded as a fatality either at nonrepowered turbines or at repowered turbines. Since that time, the Vasco Winds and Golden Hills projects have each reported one fatality, resulting in an average mortality rate of 0.02 fatality/MW/year at each facility (Brown et al. 2016; H. T. Harvey & Associates 2018a, 2018b). These recently available monitoring results suggest a relatively low mortality rate for this species, but a potential for fatalities remains within the 450 MW program, as well as from the proposed Project. As shown in Table 3.4-8, the proposed Project could be expected to result in 0–3 fatalities per year. The calculated average and weighted average mortality rates across all repowering projects, applied to the Sand Hill Project ~~was~~were 1.~~4 to~~7 and 1.~~1~~7 fatalities per year.

Summary: The summary analysis for American kestrel is applicable for the tricolored blackbird. Implementation of PEIR Mitigation Measures BIO-11a through BIO-11i, would reduce significant impacts on tricolored blackbird but not to a less-than-significant level.

White-Tailed Kite

At the time the PEIR was prepared, white-tailed kite had not been recorded as a fatality either at nonrepowered turbines or at repowered turbines. Since that time, the Golden Hills project reported one fatality in 2017 that was excluded from the fatality estimation methods (H. T. Harvey & Associates 2018a) and one fatality in 2018 (H. T. Harvey & Associates 2018b), resulting in an average mortality rate of 0.02 fatality/MW/year. These recently available monitoring results suggest a relatively low mortality rate for this species, but a potential for fatalities remains within the 450 MW program, as well as from the proposed Project.

As shown in Table 3.4-8, the proposed Project would be expected to result in 0–3 fatalities per year. The calculated ~~average and weighted average~~ mortality ~~rates~~rate across all repowering projects, applied to the Sand Hill Project was ~~0.7 to 0.4~~2.5 fatalities per year~~, respectively.~~ (both average and weighted average).

Summary: The summary analysis for American kestrel is applicable for the white-tailed kite. Implementation of PEIR Mitigation Measures BIO-11a through BIO-11i would reduce significant impacts on white-tailed kite but not to a less-than-significant level.

Other Protected Bird Species

The fatality monitoring information available since the PEIR was published indicate the raptor mortality rate remained unchanged in the final Vasco Wind monitoring report (Brown et al. 2016) at 0.64 fatality/MW/year. The recent Golden Hills project documented an average estimated mortality rate for raptors of 1.74 fatalities/MW/year, a reduction from the nonrepowered mortality rate provided in the PEIR (2.43 fatalities/MW/year). Considering the fatality monitoring information available since the PEIR was published, the native non-raptor mortality rate remained nearly unchanged in the final Vasco Wind monitoring report (Brown et al. 2016) at 2.04 fatalities/MW/year. The recent Golden Hills project documented an average estimated mortality rate for non-raptors of 5.38 fatalities/MW/year, a modest increase from the nonrepowered mortality rate provided in the PEIR (4.50 fatalities/MW/year).

As shown in Table 3.4-8, the proposed Project would be expected to result in an estimated 45–~~251~~351 raptor fatalities per year—a ~~28~~29–87% decrease compared to nonrepowered rates. The calculated average and weighted average mortality rates across all repowering projects, applied to the Sand Hill Project was 140.9 fatalities per year (a 60% decrease) ~~to 137~~and 134.6 fatalities per year (a ~~61~~62% decrease), respectively.

For native non-raptors, as shown in Table 3.4-8, the proposed Project would be expected to result in an estimated 146–~~777~~778 native non-raptor fatalities per year—from a 78% decrease to a ~~19~~20% increase compared to nonrepowered rates. The calculated average and weighted average mortality rates across all repowering projects, applied to the Sand Hill Project was 395.2 fatalities per year (a 39% decrease) ~~to~~and 360.~~8~~6 fatalities per year (a 45% decrease), respectively.

Summary: The Summary analysis for American kestrel Impact BIO-14 is applicable for both raptors and native non-raptors. Implementation of PEIR Mitigation Measures BIO-11a through BIO-11i would reduce significant impacts on raptors and native non-raptors but not to a less-than-significant level.

PEIR Mitigation Measure BIO-11a: Prepare a Project-specific avian protection plan

All project proponents will prepare a project-specific APP to specify measures and protocols consistent with the program-level mitigation measures that address avian mortality. The project-specific APPs will include, at a minimum, the following components.

- Information and methods used to site turbines to minimize risk.
- Documentation that appropriate turbine designs are being used.
- Documentation that avian-safe practices are being implemented on project infrastructure.
- Methods used to discourage prey for raptors.
- A detailed description of the postconstruction avian fatality monitoring methods to be used (consistent with the minimum requirements outlined in Mitigation Measure BIO-11g).
- Methods used to compensate for the loss of raptors (consistent with the requirements of 2019 Updated PEIR Mitigation Measure BIO-11h).

Each project applicant will prepare and submit a draft project-specific APP to the County. The draft APP will be reviewed by the TAC for consistency and the inclusion of appropriate mitigation measures that are consistent with the PEIR and recommended for approval by the County. Each project applicant must have an approved Final APP prior to commercial operation

PEIR Mitigation Measure BIO-11b: Site turbines to minimize potential mortality of birds

Siting of turbines—using analyses of landscape features and location-specific bird use and behavior data to identify locations with reduced collision risk—may result in reduced fatalities

(Smallwood et al. 2009). All project proponents will conduct a siting process and prepare a siting analysis to select turbine locations to minimize potential impacts on bird and bat species. Proponents will utilize existing data as well as collect new site-specific data as part of the siting analysis.

Project proponents will utilize currently available guidelines such as the Alameda County SRC guidelines for siting wind turbines (Alameda County SRC 2010) and/or other currently available research or guidelines to conduct siting analysis. Additionally, project proponents will use the results of previous siting efforts to inform the analysis and siting methods as appropriate such that the science of siting continues to be advanced. All project proponents will collect field data that identify or confirm the behavior, utilization, and distribution patterns of affected avian and bat species prior to the installation of turbines. Project proponents will collect and utilize available existing information, including but not necessarily limited to: siting reports and monitoring data from previously installed projects; published use and abundance studies and reports; and topographic features known to increase collision risk (trees, riparian areas, water bodies, and wetlands).

Project proponents will also collect and utilize additional field data as necessary to inform the siting analysis for golden eagle. As required in 2019 Updated Mitigation Measure BIO-8a, surveys will be conducted to locate golden eagle nests within 2 miles of proposed project areas. Siting of turbines within 2 miles of an active or alternative golden eagle nest or active golden eagle territory will be based on a site-specific analysis of risk based on the estimated eagle territories, conducted in consultation with USFWS.

Project proponents will utilize methods (i.e., computer models) to identify dangerous locations for birds and bats based on site-specific risk factors informed by the information discussed above. The project proponents will compile the results of the siting analyses for each turbine and document these in the project-level APP, along with the specific location of each turbine.

PEIR Mitigation Measure BIO-11c: Use turbine designs that reduce avian impacts

Use of turbines with certain characteristics is believed to reduce the collision risk for avian species. Project proponents will implement the design-related measures listed below.

- Turbine designs will be selected that have been shown or that are suspected to reduce avian fatalities, based on the height, color, configuration, or other features of the turbines.
- Turbine design will limit or eliminate perching opportunities. Designs will include a tubular tower with internal ladders; external catwalks, railings, or ladders will be prohibited.
- Turbine design will limit or eliminate nesting or roosting opportunities. Openings on turbines will be covered to prevent cavity-nesting species from nesting in the turbines.
- Lighting will be installed on the fewest number of turbines allowed by FAA regulations, and all pilot warning lights will fire synchronously. Turbine lighting will employ only red or dual red-and-white strobe, strobe-like, or flashing lights (U.S. Fish and Wildlife Service 2012a). All lighting on turbines will be operated at the minimum allowable intensity, flashing frequency, and quantity allowed by FAA (Gehring et al. 2009; U.S. Fish and Wildlife Service 2012a). Duration between flashes will be the longest allowable by the FAA.

PEIR Mitigation Measure BIO-11d: Incorporate avian-safe practices into design of turbine-related infrastructure

The Project proponent will apply the following measures when designing and siting turbine-related infrastructure. These measures will reduce the risk of bird electrocution and collision.

- Permanent meteorological stations will avoid use of guy wires. If it is not possible to avoid using guy wires, the wires will be at least 4/0 gauge to ensure visibility and will be fitted with bird deterrent devices.
- All permanent meteorological towers will be unlit unless lighting is required by FAA. If lighting is required, it will be operated at the minimum allowable intensity, flashing frequency, and quantity allowed by FAA.
- To the extent possible, all powerlines will be placed underground. However, lines may be placed aboveground immediately prior to entering the substation. All aboveground lines will be fitted with bird flight diverters or visibility enhancement devices (e.g., spiral damping devices). When lines cannot be placed underground, appropriate avian protection designs must be employed. As a minimum requirement, the collection system will conform with the most current edition of the Avian Power Line Interaction Committee guidelines to prevent electrocutions.
- Lighting will be focused downward and minimized to limit skyward illumination. Sodium vapor lamps and spotlights will not be used at any facility (e.g., laydown areas, substations) except when emergency maintenance is needed. Lighting at collection facilities, including substations, will be minimized using downcast lighting and motion-detection devices. The use of high-intensity lighting; steady-burning or bright lights such as sodium vapor, quartz, or halogen; or other bright spotlights will be minimized. Where lighting is required it will be designed for the minimum intensity required for safe operation of the facility. Green or blue lighting will be used in place of red or white lighting.

PEIR Mitigation Measure BIO-11e: Retrofit existing infrastructure to minimize risk to raptors

Any existing power lines in a specific project area that are owned by the wind project operator and that are associated with electrocution of an eagle or other raptor will be retrofitted within 30 days to make them raptor-safe according to Avian Power Line Interaction Committee guidelines. All other existing structures to remain in a project area during repowering will be retrofitted, as feasible, according to specifications of PEIR Mitigation Measure BIO-11c prior to repowered turbine operation.

PEIR Mitigation Measure BIO-11f: Discourage prey for raptors

The Project proponent will apply the following measures when designing and siting turbine-related infrastructure. These measures are intended to minimize opportunities for fossorial mammals to become established and thereby create a prey base that could become an attractant for raptors.

- Rodenticide will not be utilized on the Project site to avoid the risk of raptors scavenging the remains of poisoned animals.

- Boulders (rocks more than 12 inches in diameter) excavated during Project construction may be placed in aboveground piles in the Project area so long as they are more than 500 meters (1,640 feet) from any turbine. Existing rock piles created during construction of first- and second-generation turbines will also be moved at least 500 meters (1,640 feet) from turbines.
- Gravel will be placed around each tower foundation to discourage small mammals from burrowing near turbines.

PEIR Mitigation Measure BIO-11g: Implement postconstruction avian fatality monitoring for all repowering projects

A postconstruction monitoring program will be conducted at each repowering project for a minimum of 3 years beginning on the commercial operation date (COD) of the project. Monitoring may continue beyond 3 years if construction is completed in phases. Moreover, if the results of the first 3 years indicate that baseline fatality rates (i.e., nonrepowered fatality rates) are exceeded, monitoring will be extended until the average annual fatality rate has dropped below baseline fatality rates for 2 years, and to assess the effectiveness of adaptive management measures specified in Mitigation Measure BIO-11i. An additional 2 years of monitoring will be implemented at year 10 (i.e., the tenth anniversary of the COD). Project proponents will provide access to qualified third parties authorized by the County to conduct any additional monitoring after the initial 3-year monitoring period has expired and before and after the additional 2-year monitoring period, provided that such additional monitoring utilizes scientifically valid monitoring protocols.

A technical advisory committee (TAC) will be formed to oversee the monitoring program and to advise the County on adaptive management measures that may be necessary if fatality rates substantially exceed those predicted for the project (as described below in Mitigation Measure BIO-11i). The TAC will have a standing meeting, which will be open to the public, every 6 months to review monitoring reports produced by operators in the program area. In these meetings, the TAC will discuss any issues raised by the monitoring reports and recommend to the County next steps to address issues, including scheduling additional meetings, if necessary.

The TAC will comprise representatives from the County (including one or more technical consultants, such as a biostatistician, an avian biologist, and a bat biologist), and wildlife agencies (CDFW, USFWS). Additional TAC members may also be considered (e.g., a representative from Audubon, a landowner in the program area, a representative of the operators) at the discretion of the County. The TAC will be a voluntary and advisory group that will provide guidance to the County Planning Department. To maintain transparency with the public, all TAC meetings will be open to the public, and notice of meetings will be given to interested parties.

The TAC will have three primary advisory roles: (1) to review and advise on project planning documents (i.e., project-specific APPs) to ensure that project-specific mitigation measures and compensatory mitigation measures described in this PEIR are appropriately and consistently applied, (2) to review and advise on monitoring documents (protocols and reporting) for consistency with the mitigation measures, and (3) to review and advise on implementation of the adaptive management plans.

Should fatality monitoring reveal that impacts exceed the baseline thresholds established in this PEIR, the TAC will advise the County on requiring implementation of adaptive management measures as described in Mitigation Measure BIO-11i. The County will have the decision-making authority, as it is the organization issuing the CUPs. However, the TAC will collaboratively inform the decisions of the County.

Operators are required to provide for avian use surveys to be conducted within the project area boundaries for a minimum of 30 minutes duration. Surveyors will be qualified and trained and subject to approval by the County.

Carcass surveys will be conducted at every turbine for projects with 20 or fewer turbines. For projects with more than 20 turbines, such surveys will be required at a minimum of 20 turbines, and a sample of the remaining turbines may be selected for carcass searches. The operator will be required to demonstrate that the sampling scheme and sample size are statistically rigorous and defensible. Where substantial variation in terrain, land cover type, management, or other factors may contribute to significant variation in fatality rates, the sampling scheme will be stratified to account for such variation. The survey protocol for sets and subsets of turbines, as well as proposed sampling schemes that do not entail a search of all turbines, must be approved by the County in consultation with the TAC prior to the start of surveys.

The search interval will not exceed 14 days for the minimum of 20 turbines to be surveyed; however, the search interval for the additional turbines (i.e., those exceeding the 20-turbine minimum) that are to be included in the sampling scheme may be extended up to 28 days or longer if recommended by the TAC.

The estimation of detection probability is a rapidly advancing field. Carcass placement trials, broadly defined, will be conducted to estimate detection probability during each year of monitoring. Sample sizes will be large enough to potentially detect significant variation by season, carcass size, and habitat type.

Operators will be required to submit copies of all raw data forms to the County annually, will supply raw data in a readily accessible digital format to be specified by the County, and will prepare raw data for inclusion as appendices in the annual reports. The intent is to allow the County to conduct independent analyses and meta-analyses of data across the APWRA, and to supply these data to the regulatory agencies if requested.

Annual reports submitted to the County will provide a synthesis of all information collected to date. Each report will provide an introduction; descriptions of the study area, methods, and results; a discussion of the results; and any suitable recommendations. Reports will provide raw counts of fatalities, adjusted fatality rates, and estimates of project-wide fatalities on both a per MW and per turbine basis.

2019 Updated PEIR Mitigation Measure BIO-11h: Compensate for the loss of raptors and other avian species, including golden eagles, by contributing to conservation efforts

Discussion

Several options to compensate for impacts on raptors are currently available. Some are targeted to benefit certain species, but they may also have benefits for other species. For example, USFWS's Eagle Conservation Plan (ECP) Guidelines currently outline a compensatory mitigation strategy for golden eagles using the retrofit of high-risk power poles (poles known or suspected to electrocute and kill eagles). The goal of this strategy is to eliminate hazards for golden eagles. However, because the poles are also dangerous for other large raptors (e.g., red-tailed hawk, Swainson's hawk), retrofitting them can benefit such species as well as eagles.

Similarly, although the retrofitting of electrical poles may have benefits for large raptors, such an approach may provide minimal benefits for smaller raptors such as American kestrel and burrowing owl. Consequently, additional measures would be required components of an overall mitigation package to compensate for impacts on raptors in general.

The Secretary of the Interior in the prior federal administration issued Order 3330 in October2013, outlining a "landscape-scale" approach to mitigation policies and practices of the Department of the Interior to provide for mutual benefit to multiple species when adopting strategies aimed at individual species, thereby benefitting the ecological landscape as a whole. The Order was intended for use by federal agencies, and thus the County was not required to take any particular action; however, the PEIR indicated confidence that such an approach would likely have the greatest mitigation benefits, especially when considering ongoing and long-term impacts from wind energy projects. In 2017, Secretary of the Interior Ryan Zinke, acting on a presidential executive order, revoked Order 3330 and several other related environmental directives, primarily to ensure that federal policy did not burden the development or use of domestic oil, natural gas, coal, or nuclear energy resources. However, the County still considers it to be in its interest to promote policies that benefit one species that also have high potential for benefit to additional species, or to a whole ecological system or habitat.

With these considerations in mind, the PEIR outlined several options that are currently available to compensate for impacts on raptors. The options discussed below are currently considered acceptable approaches to compensation for impacts on raptors. Although not every option is appropriate for all species, it is hoped that as time proceeds, a more comprehensive approach to mitigation will be adopted to benefit a broader suite of species than might benefit from more species-specific measures. The County recognizes that the science of raptor conservation and the understanding of wind-wildlife impacts are continuing to evolve and that the suite of available compensation options may consequently change over the life of the proposed projects.

Conservation Measures

To promote the conservation of raptors and other avian species, project proponents will compensate for raptor fatalities estimated within their project areas. Mitigation will be provided in 10-year increments, with the first increment based on the estimates (raptors/MW/year) provided in this PEIR for the Vasco Winds Project (Table 3.4-8) or the project-specific EIR for future projects. The Vasco Winds fatality rates were selected because the Vasco turbines are the most similar to those likely to be proposed for future repowering projects and consequently represent the best available fatality estimates. Each project proponent will conduct postconstruction fatality monitoring for at least 3 years beginning at project startup (date of commercial operation) and again for 2 years at year 10, as required under Mitigation Measure BIO-11g, to estimate the average number of raptors taken each year by each individual project. The project proponent will compensate for this number of raptors in subsequent 10-year increments for the life of the project (i.e., three 10-year increments) as outlined below. Mitigation Measure BIO-11g also requires additional fatality monitoring at year 10 of the project. The results of the first 3 years of monitoring and/or the monitoring at year 10 may lead to revisions of the estimated average number of raptors taken, and mitigation provided may be adjusted accordingly on a one-time basis within each of the first two 10-year increments, based on the results of the monitoring required by Mitigation Measure BIO-11g, in consultation with the TAC.

Prior to the start of operations, project proponents will submit for County approval an avian conservation strategy, as part of the project-specific APP outlined in Mitigation Measure BIO-11a, outlining the estimated number of raptor fatalities based on the number and type of turbines being constructed, and the type or types of compensation options to be implemented. Project proponents will use the avian conservation strategy to craft an appropriate strategy using a balanced mix of the options presented below, as well as considering new options suggested by the growing body of knowledge during the course of the project lifespan, as supported by a Resource Equivalency Analysis (REA) (see example in Appendix C4) or similar type of compensation assessment acceptable to the County that demonstrates the efficacy of proposed mitigation for impacts on raptors.

The County Planning Director, in consultation with the TAC, will consider, based on the REA, whether the proposed avian conservation strategy is adequate, including consideration of whether each avian mitigation plan incorporates a landscape-scale approach such that the conservation efforts achieve the greatest possible benefits. Compensation measures as detailed in an approved avian conservation strategy must be implemented within 1 year of the date of commercial operations. Avian conservation strategies will be reviewed and may be revised by the County every 10 years, and on a one-time basis in each of the two 10-year increments based on the monitoring required by Mitigation Measure BIO-11g.

- **Retrofitting high-risk electrical infrastructure.** USFWS's ECP Guidelines outline a compensatory mitigation strategy using the retrofit of high-risk power poles (poles known or suspected to electrocute and kill eagles). USFWS has developed an REA (U.S. Fish and Wildlife Service 2013) as a tool to estimate the compensatory mitigation (number of retrofits) required for the take of eagles. The REA takes into account the current understanding of eagle life history factors, the effectiveness of retrofitting poles, the expected annual take, and the timing of implementation of the pole retrofits. The project proponents may need to contract with a utility or a third-party mitigation account (such as the National Fish and Wildlife Foundation) to retrofit the number of poles needed as demonstrated by a project-specific REA. If contracting directly, the project proponent will consult with utility companies to ensure that high-risk poles have been identified for retrofitting. Proponents will agree in writing to pay the utility owner/operator to retrofit the required number of power poles and maintain the retrofits for 10 years and will provide the County with documentation of the retrofit agreement. The first retrofits will be based on the estimated number of eagle fatalities as described above in this measure or as developed in the project-specific EIR for future projects. Subsequent numbers of retrofits required for additional 10-year durations will be based on the results of project-specific fatality monitoring as outlined in PEIR Mitigation Measure BIO-11g. If fewer eagle fatalities are identified through the monitoring, the number of future required retrofits may be reduced through a project-specific REA. Although retrofitting poles has not been identified as appropriate mitigation for other large raptors, they would likely benefit from such efforts, as they (particularly red-tailed and Swainson's hawks) constitute the largest non-eagle group to suffer electrocution on power lines (Avian Power Line Interaction Committee 2006).
- **Measures outlined in an approved Eagle Conservation Plan and Bird and Bat Conservation Strategy.** Project proponents may elect to apply for ~~programmatic~~ eagle

incidental take permits from USFWS. The ~~programmatic~~ eagle incidental take permit process currently involves preparation of an ECP and a Bird and Bat Conservation Strategy (BBCS). The ECP specifies avoidance and minimization measures, advanced conservation practices, and compensatory mitigation for eagles—conditions that meet USFWS's criteria for issuance of a permit. The BBCS outlines measures being implemented by the applicant to avoid and minimize impacts on migratory birds, including raptors. If ~~programmatic~~ eagle incidental take permits are obtained by project proponents, those permit terms, including the measures outlined in the approved ECP and BBCS, may constitute an appropriate conservation measure for estimated take of golden eagles and other raptors, provided such terms are deemed by the County to be comparable to or more protective of raptors than the other options listed herein.

- **Contribute to raptor conservation efforts.** Project proponents will contribute funds, in ~~the amount of $580/~~an amount equal to the average cost to rehabilitate one raptor at the California Raptor Center, affiliated with the UC Davis School of Veterinary Medicine – which receives more than 200 injured or ill raptors annually (Stedman pers. comm.) – per raptor fatality, in 10-year increments to local and/or regional conservation efforts designed to protect, recover, and manage lands for raptors, or to conduct research involving methods to reduce raptor fatalities or increase raptor productivity. ~~The $580 amount is based on the average cost to rehabilitate one raptor at the California Raptor Center, affiliated with the UC Davis School of Veterinary Medicine, which receives more than 200 injured or ill raptors annually (Stedman pers. comm.).~~ Ten-year installments are more advantageous than more frequent installments for planning and budgeting purposes.

  The funds will be contributed to an entity or entities engaged in these activities, such as the East Bay Regional Park District and the Livermore Area Regional Park District. Conservation efforts may include constructing and installing nest boxes and perches, conducting an awareness campaign to reduce the use of rodenticide, and conducting research to benefit raptors. The specific conservation effort to be pursued will be submitted to the County for approval as part of the avian conservation strategy review process. The donation receipt will be provided to the County as evidence of payment.

  The first contributions for any given project will be based on the estimated number of raptor fatalities as described above in this measure or as developed in the project-specific EIR for future projects. Funds for subsequent 10-year installments will be provided on the basis of the average annual raptor fatality rates determined through postconstruction monitoring efforts, allowing for a one-time adjustment within each 10-year increment after the results of the monitoring efforts are available. If fewer raptor fatalities are detected through the monitoring effort, the second installment amount may be reduced to account for the difference between the first estimated numbers and the monitoring results. In the event of such an adjustment, and on each ten-year anniversary, projected costs shall be adjusted for inflation (from the base amount ~~of $580/raptor~~described above) according to the CPI through the remainder of the ten-year term or the subsequent ten-year term. Review shall occur at the time that monitoring reports are accepted by the Planning Director showing a change in total raptor fatalities for the project. All eight raptor species listed in Table 3.4-4 shall be accounted for in estimating the payment.

- **Contribute to regional conservation of raptor habitat.** Project proponents may address regional conservation of raptor habitat by funding the acquisition of conservation easements within the APWRA or on lands in the same eco-region outside the APWRA, subject to County approval, for the purpose of long-term regional conservation of raptor habitat. Lands proposed for conservation must be well-managed grazing lands similar to those on which the projects have been developed. Project proponents will fund the regional conservation and improvement of lands (through habitat enhancement, lead abatement activities, elimination of rodenticides, and/or other measures) using a number of acres equivalent to the conservation benefit of the raptor recovery and conservation efforts described above, or as determined through a project-specific REA (see example REA in Appendix C4). The conservation lands must be provided for compensation of a minimum of 10 years of raptor fatalities, as 10-year increments will minimize the transaction costs associated with the identification and conservation of lands, thereby increasing overall cost effectiveness. The conservation easements will be held by an organization whose mission is to purchase and/or otherwise conserve lands, such as The Trust for Public Lands, The Nature Conservancy, California Rangeland Trust, or the East Bay Regional Parks District. The project proponents will obtain approval from the County regarding the amount of conserved lands, any enhancements proposed to increase raptor habitat value, and the entity holding the lands and/or conservation easement.

- **Other Conservation Measures Identified in the Future.** As noted above, additional conservation measures for raptors may become available in the future. Conservation measures for raptors are currently being developed by USFWS and nongovernmental organizations (e.g., American Wind Wildlife Institute)—for example, activities serving to reduce such fatalities elsewhere, and enhancing foraging and nesting habitat. Additional options for conservation could include purchasing credits at an approved mitigation bank, credits for the retirement of windfarms that are particularly dangerous to birds or bats, the curtailment of prey elimination programs, and hunter-education programs that remove sources of lead from the environment. Under this option, the project proponent may make alternative proposals to the County for conservation measures—based on an REA or similar compensation assessment—that the County may accept as mitigation if they are deemed by the County to be comparable to or more protective of raptor species than the other options described herein.

PEIR Mitigation Measure BIO-11i: Implement an avian adaptive management program

If fatality monitoring described in Mitigation Measure BIO-11g results in an estimate that exceeds the preconstruction baseline fatality estimates (i.e., estimates at the nonrepowered turbines as described in this PEIR) for any focal species or species group (i.e., individual focal species, all focal species, all raptors, all non-raptors, all birds combined), project proponents will prepare a project-specific adaptive management plan within 2 months following the availability of the fatality monitoring results. These plans will be used to adjust operation and mitigation to the results of monitoring, new technology, and new research to ensure that the best available science is used to minimize impacts to below baseline. Project-specific adaptive management plans will be reviewed by the TAC, revised by project proponents as necessary, and approved by the County. The TAC will take current research and the most effective impact reduction strategies into account when reviewing adaptive management plans and suggesting measures to reduce impacts. The project-specific adaptive management plans will be implemented within 2 months of approval by the County. The plans will include a stepped approach whereby an adaptive measure or measures are implemented, the results are monitored for success or failure for a year, and additional adaptive measures are added as necessary, followed by another year of monitoring, until the success criteria are achieved (i.e., estimated fatalities are below the baseline). Project proponents should use the best measures available when the plan is prepared in consideration of the specific adaptive management needs. For example, if only one threshold is exceeded, such as golden eagle fatalities, the plan and measures used will target that species. As set forth in other agreements in the APWRA, project proponents may also focus adaptive management measures on individual or multiple turbines if those turbines are shown to cause a significantly disproportionate number of fatalities.

In general, the following types of measures will be considered by the TAC, in the order they are presented below; however, the TAC may recommend any of these or other measures that are shown to be successful in reducing the impact.

ADMM-1: Visual Modifications. The project proponent will paint a pattern on a proportion of the turbine blades. The proportion and the pattern of the blades to be painted will be determined by the County in consultation with the TAC. USFWS recommends testing measures to reduce *motion smear*—the blurring of turbine blades due to rapid rotation that renders them less visible and hence more perilous to birds in flight. Suggested techniques include painting blades with staggered stripes or painting one blade black. The project proponent will conduct fatality studies on a controlled number of painted and unpainted turbines. The project proponent will coordinate with the TAC to determine the location of the painted turbines, but the intent is to implement this measure in areas that appear to be contributing most to the high number of fatalities detected.

ADMM-2: Anti-Perching Measures. The County will consult with the TAC regarding the use of anti-perching measures to discourage bird use of the area. The TAC will use the most recent research and information available to determine, on a case-by–case basis, if anti-perching measures will be an effective strategy to reduce impacts. If determined to be feasible, antiperching devices will be installed on artificial structures, excluding utility poles, within 1 mile of project facilities (with landowner permission) to discourage bird use of the area.

ADMM-3: Prey Reduction. The project proponent will implement a prey reduction program around the most hazardous turbines. Examples of prey reduction measures may include changes in grazing practices to make the area less desirable for prey species, active reduction through direct removal of prey species, or other measures provided they are consistent with management goals for threatened and endangered species.

ADMM-4: Implementation of Experimental Technologies. Project proponents can deploy experimental technologies at their facilities to test their efficacy in reducing turbine-related fatalities. Examples may include, but are not limited to, visual deterrents, noise deterrents, and active radar systems.

ADMM-5: Turbine Curtailment. If postconstruction monitoring indicates patterns of turbine-caused fatalities—such as seasonal spikes in fatalities, topographic or other environmental features associated with high numbers of fatalities, or other factors that can potentially be manipulated and that suggest that curtailment of a specific turbine's operation would result in reducing future avian fatalities—the project operator will curtail operations of the offending turbine or turbines. Curtailment restrictions would be developed in coordination with the TAC and based on currently available fatality data, use data, and research.

ADMM-6: Cut-in Speed Study. Changes in cut-in speed could be conducted to see if changing cut-in speeds from 3 meters per second to 5 meters per second (for example) would significantly reduce avian fatalities. The proponent will coordinate with the TAC in determining the feasibility of the measure for the particular species affected as well as the amount of the change in the cut-in speed.

ADMM-7: Real-Time Turbine Curtailment. The project proponent can employ a real-time turbine curtailment program designed in consultation with the TAC. The intent would be to deploy a biologist to monitor onsite conditions and issue a curtailment order when raptors are near operating turbines. Alternatively, radar, video, or other monitoring measures could be deployed in place of a biological monitor if there is evidence to indicate that such a system would be as effective and more efficient than use of a human monitor.

Impact BIO-12: Potential mortality or disturbance of bats from roost removal or disturbance (less than significant with mitigation)

Several species of both common (*Myotis* spp.) and special-status (western red bat, pallid bat, Townsend's big-eared bat) bats are known to occur or could occur in or around the Project area, and could use the area for foraging, dispersal, and migration. Bats may use rock outcrops, trees, and artificial structures in the Project area as maternity or migratory stopover roosts. Permanent water bodies and stock tanks in and adjacent to the program area provide sources of fresh water for both resident and migratory bats.

Construction and decommissioning of turbines could result in disturbance or loss of active bat roosts through increased traffic, noise, lighting, and human access. Removal or disturbance of trees, rock outcrops, debris piles, outbuildings, or other artificial structures could result in removal of roost habitat and mortality of bats using the structure as a roost. Several species of bat are sensitive to disturbance and may abandon flightless young, or they may simply not return to the roost once disturbed, resulting in the loss of that roost as habitat for the local population. Because some bats roost colonially, removal of special-status species' roost structures in a roost-limited habitat could result in the loss of a significant portion of the local bat population. This would be a significant impact. Implementation of 2019 Updated PEIR Mitigation Measure BIO-1b and PEIR Mitigation Measures BIO-3a, BIO-12a, and BIO-12b would reduce this impact to a less-than-significant level. These measures would be effective in reducing impacts to a less than significant level because they include surveys to identify active bat roosts and potential roosts within 750 feet of construction activities and establish buffers and identify protection measures to minimize disturbance of active roosts near work areas.

2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

PEIR Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

PEIR Mitigation Measure BIO-12a: Conduct bat roost surveys

Prior to development of any repowering project, a qualified bat biologist will conduct a roost habitat assessment to identify potential colonial roost sites of special-status and common bat species within 750 feet of the construction area. If suitable roost sites are to be removed or otherwise affected by the proposed project, the bat biologist will conduct targeted roost surveys of all identified sites that would be affected. Because bat activity is highly variable (both spatially and temporally) across the landscape and may move unpredictably among several roosts, several separate survey visits may be required. Surveys will be repeated at different times of year if deemed necessary by the bat biologist to determine the presence of seasonally active roosts (hibernacula, migratory stopovers, maternity roosts). Appropriate field methods will be employed to determine the species, type, and vulnerability of the roost to construction disturbance. Methods will follow best practices for roost surveys such that species are not disturbed and adequate temporal and spatial coverage is provided to increase likelihood of detection.

Roost surveys may consist of both daylight surveys for signs of bat use and evening/night visit(s) to conduct emergence surveys or evaluate the status of night roosts. Survey timing should be adequate to account for individual bats or species that might not emerge until well after dark.

Methods and approaches for determining roost occupancy status should include a combination of the following components as the biologist deems necessary for the particular roost site.

- Passive and/or active acoustic monitoring to assist with species identification.
- Guano traps to determine activity status.
- Night-vision equipment.
- Passive infrared camera traps.

At the completion of the roost surveys, a report will be prepared documenting areas surveyed, methods, results, and mapping of high-quality habitat or confirmed roost locations.

PEIR Mitigation Measure BIO-12b: Avoid removing or disturbing bat roosts

- Active bat roosts will not be disturbed, and will be provided a minimum buffer of 500 feet where preexisting disturbance is moderate or 750 feet where preexisting disturbance is minimal. Confirmation of buffer distances and determination of the need for a biological monitor for active maternity roosts or hibernacula will be obtained in consultation with CDFW. At a minimum, when an active maternity roost or hibernaculum is present within 750 feet of a construction site, a qualified biologist will conduct an initial assessment of the roost response to construction activities and will recommend buffer expansion if there are signs of disturbance from the roost.
- Structures (natural or artificial) showing evidence of significant bat use within the past year will be left in place as habitat wherever feasible. Should such a structure need to be removed or disturbed, CDFW will be consulted to determine appropriate buffers, timing and methods, and compensatory mitigation for the loss of the roost.
- All project proponents will provide environmental awareness training to construction personnel, establish buffers, and initiate consultation with CDFW if needed.
- Artificial night lighting within 500 feet of any roost will be shielded and angled such that bats may enter and exit the roost without artificial illumination and the roost does not receive artificial exposure to visual predators.
- Tree and vegetation removal will be conducted outside the maternity season (April 1–September 15) to avoid disturbance of maternity groups of foliage-roosting bats.

- If a maternity roost or hibernaculum is present within 500 feet of the construction site where preexisting disturbance is moderate or within 750 feet where preexisting disturbance is minimal, a qualified biological monitor will be onsite during groundbreaking activities.

Impact BIO-13: Potential for construction activities to temporarily remove or alter bat foraging habitat (less than significant)

Construction of the repowering project could degrade bat foraging habitat by replacing vegetation with nonvegetated land cover types. Project construction would create a temporary increase in traffic, noise, and artificial night lighting in the program area, reducing the extent of landscape available for foraging. However, the amount of landscape returned to foraging habitat in the process of decommissioning the first- and second-generation turbines would offset the amount of foraging habitat lost to repowering activities. This impact would be less than significant. No mitigation is required.

Impact BIO-14: Turbine-related fatalities of special-status and other bats (significant and unavoidable)

As noted in the PEIR, resident and migratory bats flying in and through the Project area may be killed by collision with wind turbine blades or other interaction with the wind turbine generators. Repowering in the Project area would introduce increased fatality risk, particularly to migratory bats.

Extrapolating from existing fatality data and from trends observed at other wind energy facilities where fourth-generation turbines are in operation, it appears likely that fatalities would primarily be associated with wind speeds of less than 5-6 m/s; that fatalities would occur predominantly in the late summer to mid-fall migration period; that fatalities would consist mostly of migratory bats, particularly Mexican free-tailed bat and hoary bat; that fatalities would occur sporadically at other times of year; and that fatalities of one or more other species would occur in smaller numbers. ~~As shown in Table 3.4-9 (updated from Table 3.4-15 in the PEIR),~~As discussed earlier, bat fatality detections were uncommon prior to the advent of using trained dogs in surveys; thus it is likely that bat fatality rates estimated from older studies, such as those used in the PEIR (i.e., Vasco Winds and Buena Vista), substantially underestimated actual fatalities. In the absence of more reliable data, those estimates were used to create the baseline fatalities shown in Table 3.4-10 (updated from Table 3.4-15 in the PEIR). There are two recent sources of estimated fatality rates for repowered turbines, developed for Vasco Winds (Brown et al. 2016) and for Golden Hills (H. T. Harvey & Associates 2018a, 2018b); the latter used trained dogs to perform carcass searches and thus provides the most reliable fatality estimates yet available for the APWRA. However, Smallwood and Bell (2019) note that even these estimates may substantially underestimate bat fatalities, since their observations indicate that direct observations of bat/turbine collisions would predict approximately four times the fatality rates detected using dogs, and they speculate that this could in part be due to crippling bias (injuries that subsequently prove fatal) or search radius bias (carcasses that fall far from the turbine). Thus there are reasons to suspect that all of the mortality estimates shown in Table 3.4-10 are underestimates, while there is no reason to suspect that they are overestimates. In view of these considerations, annual estimated bat fatalities in the Project area are anticipated to increase from the current estimate of 38 (under baseline) to 463~~–566-~~814 fatalities per year.

Table 3.4-~~9~~10. Estimated Range of Annual Bat Fatalities (updated from Table 3.4-15 in the PEIR)

Study Area	Capacity (MW)	Baseline Fatalities[a]	Predicted Fatalities[b]	
			Vasco Winds	Golden Hills
Existing program area	329	87	–1,055	1,854
Program Alternative 1	417	110	1,337**~~–1,635~~** **~~(700–1,635)~~**	2,350
Program Alternative 2	450	118	1,443**~~–1,764~~** **~~(756–1,764)~~**	2,536
~~Golden Hills[c]~~	~~85.9~~	~~23~~	**~~284–347 (148–347)~~**	
~~Patterson Pass[d]~~	~~19.8~~	~~5~~	**~~64–78 (33–78)~~**	
Sand Hill	144.5	38	463**~~–566~~**	814

~~Note: Information in bold text is changed or new predicted number of fatalities based on information available since the PEIR was prepared. Information in parentheses is the predicted fatalities indicated in the PEIR.~~

[a] ~~Estimate~~Estimates of total baseline fatalities are based on the Smallwood and Karas mortality rate of 0.263 fatality/MW/year derived from 2005–2007 monitoring at the APWRA.

[b] Estimate of total predicted fatalities are based on corrected mortality rates from the Vasco Winds repowering project (Brown et al. 2016~~) (3.207 fatalities/MW/year) and from the multiyear average rates from the Shiloh I project in the Montezuma Hills WRA (3.92 fatalities/MW/year).~~) and the Golden Hills repowering project (H.T. Harvey & Associates 2018b). Mortality rates for these projects averaged, for Vasco Winds, 3.207/MW/yr for 3 years, and for Golden Hills, 5.635/MW/yr for 2 years. In both studies, hoary and Mexican freetail bats accounted for >90% of all bat fatalities.

~~[c] Golden Hills was identified in the PEIR as up to 88.4 MW but 85.9 MW were ultimately constructed.~~

~~[d] The Patterson Pass project was authorized but has not been constructed.~~

The PEIR noted that "insufficient data are currently available to develop accurate fatality estimates for bats" (Alameda Community Development Department 2014:3.4-18). ~~The PEIR provided several hypotheses for evidence of an increased collision risk of repowered turbines but emphasized that there was a "high degree of uncertainty in bat fatality estimates." The corrected mortality rates for the Vasco Winds project presented in Table 3.4-9, as well as results from the recent Golden Hills project, may~~The mortality rates shown in Table 3.4-10 serve to lessen the uncertainty in bat fatality estimates.

The primary bats affected by this mortality are Mexican free-tailed and hoary bats, which together account for more than 90% of the bat fatalities observed in Vasco Winds and Golden Hills monitoring; the two species make up approximately equal fractions of the observed mortality. The Mexican free-tailed bat is not a species of conservation concern, as it is extremely widespread and in most of its range is non-migratory. The hoary bat, however, is highly migratory, with a summer range that includes much of North America, and seasonal migrations to overwinter in southern California and Mexico (Cryan 2003). The species was early identified as the single most common bat fatality at wind farms at locations throughout the United States (Ellison 2012), both because it is a "tree bat" that is known to be attracted to forage at wind turbines (Arnett et al. 2016), and because it is highly migratory. Migrations in this species are not well understood, but at least some populations make very long migrations (Cryan et al. 2014). California is geographically positioned between hoary bat populations in western Canada and the Pacific Northwest, and overwintering habitat in southern California and Mexico. Most hoary bat fatalities detected in the APWRA have occurred in the fall, during the southward bat migration, so it is likely that most hoary bat fatalities in the area involve migratory rather than resident bats, and this may also indicate that their spring migration has less exposure in the APWRA. It is thus likely that many of the fatalities observed at APWRA are derived from a large migratory population that summers north of the area.

Frick et al. (2017) developed population models of hoary bats in North America and showed that, due to high mortality rates and low reproductive rates, continuation of current mortality rates associated with wind power facilities could “pose a substantial threat to migratory bats in North America,” with possible outcomes for the hoary bat including local extirpation. Data corroborating this proposition have been published by Rodhouse et al. (2019), who find evidence for region-wide summer declines of hoary bats in the Pacific Northwest (Washington and Oregon) between 2010 and 2018; they propose “the hypothesis that the longer duration and greater geographic extent of the wind energy stressor (collision and barotrauma) have impacted the species.” It is thus possible that the proposed project could cause or contribute to declines in regional hoary bat populations.

Summary: The PEIR concluded that “Insufficient data are currently available to develop accurate fatality estimates for individual bat species~~.”~~,” but subsequent analyses using more frequent and intensive surveys, and especially surveys using trained dogs and handlers, have produced fatality estimates that are both more confident and substantially larger; though, there are still reasons to suspect that observed fatality rates may be biased low. The PEIR described potential impacts on five species of bats, but noted that two species, Mexican free-tailed bats and hoary bats, were most vulnerable. ~~Indeed, despite the finding that two additional species of bats were detected as fatalities at repowered projects, the additional information discussed in this analysis further supports the conclusion that Mexican free-tailed bats and hoary bats constitute most of the fatalities.~~Subsequent work has shown that these two species account for more than 90% of bat fatalities recorded in the APWRA (Brown et al. 2016, H. T. Harvey & Associates 2018b). The PEIR noted that information available at the time indicated that bat collision risk increases substantially when old-generation turbines are replaced by newer, larger turbines~~.~~, a finding corroborated by studies indicating that bat fatality rates increase with use of taller turbines. The PEIR further noted that “Turbines used in future repowering projects are likely to be similar in size to Vasco Winds turbines but much larger than the Diablo Winds and Buena Vista turbines in both overall size and rated nameplate capacity.” The proposed Sand Hill turbines are moderately larger than Diablo Winds in terms of physical dimensions but are substantially larger in rated nameplate capacity. As noted in this analysis, the larger nameplate capacity of the Sand Hill turbines essentially results in a need for fewer turbines to meet the same nameplate capacity. A comparison to the recent Golden Hills project (phases 1 and 2) further illustrates this, where 62 turbines were needed to produce less energy than the proposed Project’s 40 turbines. Overall, the PEIR found that “Despite the high level of uncertainty in estimates of bat fatality rates, all available data suggest that repowering would result in a substantial increase in bat fatalities.” The recently available information further supports this conclusion in the PEIR and does not alter its significance with regard to the proposed Project.

While the PEIR set forth multiple measures to address bat mortality, it concluded that these measures would not reduce the impact to a less-than-significant level, because, as described in Impact BIO-14a-2 of the PEIR, “despite the high level of uncertainty in estimates of bat fatality rates, all available data suggest that repowering would result in a substantial increase in bat fatalities.” The degree of increase may be influenced by the following factors. This conclusion holds true for the Project, and, although it remains difficult to estimate bat mortality rates with certainty, continued monitoring using techniques that are already well established, specifically, the use of trained dogs and their handlers, would contribute to the body of knowledge informing this effort, as noted in the recent H. T. Harvey & Associates (2018a, 2018b) monitoring reports~~.~~, the study of search effectiveness presented by Smallwood and Bell (2019), and multiple additional sources cited therein. Implementation of PEIR Mitigation Measures BIO-14a through BIO-14e would reduce significant impacts on bats but not to a less-than-significant level.

PEIR Mitigation Measure BIO-14a: Site and select turbines to minimize potential mortality of bats

The Project proponent will use the best information available to site turbines and to select from turbine models in such a manner as to reduce bat collision risk. The siting and selection process will take into account bat use of the area and landscape features known to increase collision risk (trees, edge habitats, riparian areas, water bodies, and wetlands). Measures include but are not limited to siting turbines the greatest distance feasible up to 500 meters (1,640) feet from still or flowing bodies of water, riparian habitat, known roosts, and tree stands (California Bat Working Group 2006:6).

To generate site-specific "best information" to inform turbine siting and operation decisions, a bat habitat assessment and roost survey will be conducted in the Project area to identify and map habitat of potential significance to bats, such as potential roost sites (trees and shrubs, significant rock formations, artificial structures) and water sources. Turbine siting decisions will incorporate relevant bat use survey data and bat fatality records published by other projects in the APWRA. Roost surveys will be carried out according to the methods described in PEIR Mitigation Measure BIO-12a.

2019 Updated PEIR Mitigation Measure BIO-14b: Implement postconstruction bat fatality monitoring program for all repowering projects

A scientifically defensible, postconstruction bat fatality monitoring program will be implemented to estimate actual bat fatalities and determine if additional mitigation is required. Bat-specific modifications to the 3-year postconstruction monitoring program described in PEIR Mitigation Measure BIO-11g, developed in accordance with CEC 2007 and with appropriate recommendations from California Bat Working Group guidelines (2006), will be implemented.

In addition to the requirements outlined in PEIR Mitigation Measure BIO-11g, the following ~~two~~three bat-specific requirements will be added.

- Include on the TAC at least one biologist with significant expertise in bat research and wind energy impacts on bats.
- Perform postconstruction bat fatality monitoring using trained dogs with handlers. In order to optimize monitoring success, these efforts should also include searching to a maximum radius around wind turbines that includes all deposited carcasses, searching along transects spaced closely together, and searching frequently. Recognizing that most bat fatalities in the APWRA are recorded from September through November, it is appropriate to concentrate search efforts during that period, while still maintaining some level of search effort throughout the year.
- Conduct bat acoustic surveys concurrently with fatality monitoring in the Project area to estimate nightly, seasonal, or annual variations in relative activity and species use patterns, and to contribute to the body of knowledge on seasonal bat movements and relationships between acoustic bat activity and turbine fatality. Should emerging research support the approach, these data may be used to generate site-specific predictive models to increase the precision and effectiveness of mitigation measures (e.g., the season specific, multivariate

models described by Weller and Baldwin 2011:11). Acoustic bat surveys will be designed, and data analysis conducted by qualified biologists with significant experience in acoustic bat survey techniques. Methods will be informed by the latest available guidelines (California Energy Commission guidelines, 2007); California Bat Working Group guidelines, 2006), except where best available science supports technological or methodological updates. High-quality, sensitive acoustic equipment will be used to produce data of sufficient quality to generate species identifications. Survey design and methods will be scientifically defensible and will include, at a minimum, the following elements

- Acoustic detectors will be installed at multiple stations to adequately sample range of habitats in the Project area for both resident and migratory bats. The number of detector arrays installed per project site will incorporate emerging research on the density of detectors required to adequately meet sampling goals and inform mitigation approaches (Weller and Baldwin 2011:10).
- Acoustic detector arrays will sample multiple airspace heights including as close to the repowered rotor swept area as possible. Vertical structures used for mounting may be preexisting or may be installed for the Project (e.g., temporary or permanent meteorological towers).
- Surveys will be conducted such that data are collected continuously from early July to early November to cover the activity transition from maternity to migration season and determine if there is elevated activity during migration. Survey season may be adjusted to more accurately reflect the full extent of the local migration season and/or season(s) of greatest local bet fatality risk, if scientifically sound data support doing so.
- Anticipated adaptive management goals, such as determining justifiable timeframes to reduce required periods of cut-in speed adjustments, will be reviewed with the TAC and incorporated in designing the acoustic monitoring and data analysis program.

Modifications to the fatality search protocol will be implemented to obtain better information on the number and timing of bat fatalities (e.g., Johnston et al. 2013:85). Modifications will include decreases in the transect width and search interval for a period of time coinciding with high levels of bat mortality, i.e., the fall migration season (roughly August to early November, or as appropriate in the view of the TAC). The nature of bat-specific transect distance and search intervals will be determined in consultation with the TAC and will be guided by scientifically sound and pertinent data on rates of bat carcass detection at wind energy facilities (e.g., Johnston et al. 2013:54–55) and site-specific data from APWRA repowering project fatality monitoring programs as these data become available.

Other methods to achieve the goals of the bat fatality monitoring program while avoiding prohibitive costs may be considered subject to approval by the TAC, if these methods have been peer reviewed and evidence indicates the methods are effective. For example, if project proponents wish to have the option of altering search methodology to a newly developed method, such as searching only roads and pads (Good et al. 2011:73), a statistically robust field study to index the results of the methodology against standard search methods will be conducted concurrently to ensure site-specific, long-term validity of the new methods.

Finally, detection probability trials will utilize bat carcasses to develop bat-specific detection probabilities. Care should be taken to avoid introducing novel disease reservoirs; such avoidance will entail using onsite fatalities or using carcasses obtained from within a reasonably anticipated flight distance for that species.

PEIR Mitigation Measure BIO-14c: Prepare and publish annual monitoring reports on the findings of bat use of the Project area and fatality monitoring results

Annual reports of bat use results and fatality monitoring will be produced within 3 months of the end of the last day of fatality monitoring. Special-status bat species records will be reported to CNDDB.

PEIR Mitigation Measure BIO-14d: Develop and implement a bat adaptive management plan

In concert with 2019 Updated PEIR Mitigation Measure BIO-14b, the Project proponent will develop adaptive management plans to ensure appropriate, feasible, and current incorporation of emerging information. The goals of the adaptive management plans are to ensure that the best available science and emerging technologies are used to assess impacts on bats, and that impacts are minimized to the greatest extent possible while maximizing energy production.

The project-specific adaptive management plans will be used to adjust operation and mitigation to incorporate the results of Project area monitoring and new technology and research results when sufficient evidence exists to support these new approaches. These plans will be reviewed by the TAC and approved by the County. All adaptive management measures will be implemented within a reasonable timeframe, sufficient to allow the measures to take effect in the first fall migration season following the year of monitoring in which the adaptive management threshold was crossed. ADMMs may be modified by the County in consultation with the TAC to take into account current research, site-specific data, and the most effective impact reduction strategies. ADMMs will include a scientifically defensible, controlled research component and minimum post-implementation monitoring time to evaluate the effectiveness and validity of the measures. The minimum monitoring time will consist of three sequential fall seasons of the bat-specific mortality monitoring program covering the 3–4 months of the year in which the highest bat mortality has been observed: likely August–November. The start and end dates of the 3–4 months of bat-specific mortality monitoring period will be based on existing fatality data and in consultation with the TAC.

Determining a fatality threshold to trigger adaptive management is not straightforward, as insufficient information exists on the status and vitality of the populations of migratory bat species subject to mortality in the APWRA. The low estimate of anticipated bat fatality rates is from the Vasco Winds project in the APWRA. Applying this rate programmatically would result in an estimate of 21,000 bats killed over the 30-year life of the program. The high estimate is from the Montezuma Hills Wind Resource Area. Applying this rate programmatically would result in an estimate of 49,050 bats killed over the 30-year life of the program. Bats are slow to reproduce, and turbines may be more likely to kill adult bats than juveniles, suggesting that a conservative approach is warranted. Accordingly, an initial adaptive management threshold will be established using the low fatality estimates, or 1.679 fatalities/MW/year, to ensure that the most conservative trigger for implementation of adaptive management measures is adopted.

If postconstruction fatality monitoring results in a point estimate for the bat fatality rate that exceeds the 1.679 fatalities/MW/year threshold by a statistically significant amount, then, in consultation with the TAC, ADMM-7 and ADMM-8 (described below) for bats will be implemented.

It is important to note that neither the high nor the low estimate speaks to the ability of bat populations to withstand the associated levels of take. The initial fatality rate threshold triggering adaptive management may be modified by the TAC if appropriate and if such adaptation is supported by the best available science.

The TAC may direct implementation of adaptive management measures for other appropriate reasons, such as an unexpectedly and markedly high fatality rate observed for any bat species, or special-status species being killed in unexpectedly high numbers.

ADMMs for bats may be implemented using a stepped approach until necessary fatality reductions are reached, and monitoring methods must be revised as needed to ensure accurate measurement of the effectiveness of the ADMMs. Additional ADMMs for bats should be developed as new technologies or science supports doing so.

ADMM-7: Seasonal Turbine Cut-in Speed Increase. Cut-in speed increases offer the most promising and immediately available approach to reducing bat fatalities at fourth-generation wind turbines. Reductions in fatalities ~~(~~ of 53–87~~%)~~% were observed when increasing modern turbine cut-in speed to 5.0–6.5 m/s (Arnett et al. 2009:3; Good et al. 2012:iii). A recent study in the APWRA documented significant reductions in fatalities using curtailment during the peak migration period (Smallwood and Bell 2019). Work at a site in Wisconsin has shown that a site-specific, real-time curtailment algorithm using wind speed and bat activity information can yield 74-92% fatality reductions at a 3.2% cost in revenue from the turbines (Hayes et al. 2019). Other curtailment studies, also performed in sites outside the APWRA, have shown comparable effectiveness (e.g. Hein et al. 2014). While implementing this measure immediately upon a project's commencement would likely reduce bat fatalities, that assumption is not yet supported by conclusive data. Moreover, without establishing baseline fatality at repowered projects, there would be no way to determine the effectiveness of the approach or whether the costs of increased cut-in speeds (and consequent power generation reductions) were providing fatality reductions. However, although strategies for curtailing turbines hold great promise, developing thresholds is difficult. This is especially true when supporting data are limited or unreliable (Arnett et al. 2013). Accordingly it will be necessary to develop and test a curtailment strategy appropriate for the proposed project.

Cut-in speed increases will be implemented as outlined below, with effectiveness assessed annually.

- The Project proponent will increase cut-in speed to 5.0 m/s from sunset to sunrise during peak migration season (generally August–October). If this is ineffective, the Project proponent will increase turbine cut-in speed by annual increments of 0.5 m/s until target fatality reductions are achieved.
- The Project proponent may refine site-specific migration start dates on the basis of pre- and postconstruction acoustic surveys and ongoing review of dates of fatality occurrences for migratory bats in the APWRA.
- The Project proponent may request a shorter season of required cut-in speed increases with substantial evidence that similar levels of mortality reduction could be achieved. Should resource agencies and the TAC find there is sufficient support for a shorter period (as low as

8 weeks), evidence in support of this shorter period will be documented for the public record and the shorter period may be implemented.

- The Project proponent may request shorter nightly periods of cut-in speed increases with substantial evidence from defensible onsite, long-term postconstruction acoustic surveys indicating predictable nightly timeframes when target species appear not to be active. Target species are here defined as migratory bats or any other species appearing repeatedly in the fatality records.
- The Project proponent may request exceptions to cut-in speed increases for particular weather events or wind patterns if substantial evidence is available from onsite acoustic or other monitoring to support such exceptions (i.e., all available literature and onsite surveys indicate that bat activity ceases during specific weather events or other predictable conditions).
- In the absence of defensible site-specific data, mandatory cut-in speed increases will commence on August 1 and continue through October 31, and will be in effect from sunset to sunrise.

ADMM-8: Emerging Technology as Mitigation. The Project proponent may request, with consultation and approval from agencies, replacement or augmentation of cut-in speed increases with developing technology or another mitigation approach that has been proven to achieve similar bat fatality reductions.

The Project proponent may also request the second tier of adaptive management to be the adoption of a promising but not fully proven technology or mitigation method. These requests are subject to review and approval by the TAC and must include a controlled research component designed by a qualified principal investigator so that the effectiveness of the method may be accurately assessed.

Some examples of such emerging technologies and research areas that could be incorporated in adaptive management plans are listed below.

- The use of acoustic deterrents (Arnett et al. 2013:1).
- The use of altitude-specific radar, night vision and/or other technology allowing bat use monitoring and assessment of at-risk bat behavior (Johnston et al. 2013: 90-91) if research in these areas advances sufficiently to allow effective application of these technologies.
- Application of emerging peer-reviewed studies on bat biology (such as studies documenting migratory corridors or bat behavior in relation to turbines) that support specific mitigation methods.

PEIR Mitigation Measure BIO-14e: Compensate for expenses incurred by rehabilitating injured bats

The cost of reasonable, licensed rehabilitation efforts for any injured bats taken to wildlife care facilities from the program area will be assumed in full by Project proponents.

Impact BIO-15: Potential for road infrastructure upgrades and installation of electrical collection lines to result in adverse effects on alkali wetlands/drainages (less than significant with mitigation)

Alkali wetlands/drainages occur within the Project area. Existing facilities, particularly the access roads, may cross or occur adjacent to these wetlands and drainages, and decommissioning or construction activities that result in ground disturbance (including temporary fill and extension of culverts and installation of electrical collection lines) could directly or indirectly affect alkali wetlands/drainages that qualify as waters of the United States and waters of the State.

Access road expansion and installation of the electrical collection lines have the potential to permanently affect up to 0.04 acre of alkali wetland/drainage. Temporary impacts could occur in up to 0.42 acre of alkali wetland/drainage. Horizontal directional drilling (HDD) may be used to avoid the surface disturbance of some aquatic habitats; however, the exact locations where HDD may be used are not currently known. Consequently, impacts on alkali wetlands/drainages are assumed to occur, but may ultimately be less than those described.

Additionally, some activities would have indirect effects (not quantified) on some alkali wetland/drainage habitats through potential changes in hydrology and water quality if the activities are conducted near these habitats. Indirect effects could involve altered hydrology or runoff of sediment and other substances during road construction activities. Some effects, such as those due to runoff, would be avoided and minimized through implementation of erosion control BMPs and postconstruction reclamation. Installation of new and upgraded culverts would maintain existing hydrology.

Loss of alkali wetland/drainage habitats as a result of direct fill would be a substantial adverse effect on sensitive natural communities that are regulated by USACE and the Regional Water Board. This would be a significant impact; however, implementation of 2019 Updated PEIR Mitigation Measures BIO-1b, BIO-15, and BIO-18 and PEIR Mitigation Measure BIO-1e would reduce this impact to a level less-than-significant level. These measures would implement practices to avoid impacts where feasible on sensitive natural communities, including wetlands and drainages, present in the areas of proposed ground disturbance, or minimize the impacts if complete avoidance is not feasible. Avoidance BMPs would include training of construction personnel, installation of exclusion fencing, water quality protection and erosion control, and monitoring of the BMP implementation around alkali wetlands and drainages. Where avoidance is infeasible, compensatory mitigation would ensure there would be no net loss of alkali wetland and drainage habitat by on-site and/or offsite restoration of these habitats. No new mitigation measures are proposed.

2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

PEIR Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas

2019 Updated PEIR Mitigation Measure BIO-15: Compensate for the loss of alkali wetland/drainage habitat

If alkali wetland/drainage habitat is filled or disturbed as part of the repowering project, the project proponent will compensate for the loss of this habitat to ensure no net loss of habitat functions and values. Compensation ratios will be based on site-specific information and determined through coordination with state and federal agencies (CDFW, USFWS, USACE). Unless specified otherwise by a resource agency, the compensation will be at a minimum 1:1 ratio (1 acre restored or created for every 1 acre filled) and may be a combination of onsite restoration/creation, offsite restoration, and mitigation credits. A restoration and monitoring plan will be developed and implemented. The plan will describe how alkali wetland/drainage habitat will be created and monitored.

Impact BIO-16: Potential for road infrastructure upgrades to result in adverse effects on riparian habitat (no impact)

No riparian habitat is present in the Project area, therefore, project construction activities, including road infrastructure upgrades, would not result in effects on riparian habitat. There would be no impact.

Impact BIO-17: Potential for ground-disturbing activities to result in direct adverse effects on common habitats (less than significant)

Ground-disturbing activities would result in the permanent loss of common habitats as a result of constructing new permanent facilities and the temporary loss of common habitats as a result of constructing temporary facilities and landscape reclamation. These activities would create minor changes in total acreage of common habitats in the project area, primarily in the annual grassland plant community.

All lands disturbed by infrastructure installation or removal would be returned to preproject conditions. At each reclamation site, the topography would be graded to match the contours of the natural surrounding landscape, stabilized, reseeded with an appropriate seed mixture, and allowed to become revegetated without assistance. Reclamation activities would be guided by a reclamation plan developed in coordination with the County and other applicable agencies.

This impact would be less than significant. No mitigation is required.

Impact BIO-18: Potential for road infrastructure upgrades to result in adverse effects on wetlands and drainages (less than significant with mitigation)

Aquatic resources, including vernal pool, perennial wetland drainages, ponds, and ephemeral drainages, occur within the Project area. Existing facilities, particularly the access roads, may cross or occur adjacent to these aquatic resources, and decommissioning or construction activities that result in ground disturbance (including temporary fill and extension of culverts and installation of electrical collection lines) could directly or indirectly affect aquatic resources that qualify as waters of the United States and waters of the State.

Construction and maintenance activities would not directly affect any ponds or the vernal pool habitat in the Project area. Access road expansion and installation of the electrical collection lines have the potential to permanently affect up to 0.01 acre of perennial wetland drainage and up to 0.01 acre of ephemeral drainage habitats. Temporary impacts could occur in up to 0.09 acre of perennial wetland drainage and up to 0.17 acre of ephemeral drainage. Horizontal directional drilling (HDD) may be used to avoid the surface disturbance of some aquatic habitats; however, the exact locations where HDD may be used are not currently known. Consequently, impacts on perennial wetland drainages and ephemeral drainages are assumed to occur, but may ultimately be less than those described.

Additionally, some activities would have indirect effects (not quantified) on some aquatic habitats through potential changes in hydrology and water quality if the activities are conducted near aquatic habitats. Indirect effects could involve altered hydrology or runoff of sediment and other substances during road construction activities. Some effects, such as those due to runoff, would be avoided and minimized through implementation of erosion control BMPs and postconstruction reclamation. Installation of new and upgraded culverts would maintain existing hydrology.

Loss of perennial wetland drainage and ephemeral drainage habitats as a result of direct fill would be a substantial adverse effect on sensitive natural communities that are regulated by USACE and the Regional Water Board. This would be a significant impact; however, implementation of 2019 Updated PEIR Mitigation Measures BIO-1b and BIO-18 and PEIR Mitigation Measure BIO-1e would reduce this impact to a level less-than-significant level. These measures would implement practices to avoid impacts where feasible on sensitive natural communities, including wetlands and drainages, present in the areas of proposed ground disturbance, or minimize the impacts if complete avoidance is not feasible. Avoidance BMPs would include training of construction personnel, installation of exclusion fencing, water quality protection and erosion control, and monitoring of the BMP implementation around perennial wetland drainages and ephemeral drainages. Where avoidance is infeasible, compensatory mitigation would ensure there would be no net loss of perennial wetland drainage and ephemeral drainage habitats by on-site and/or offsite restoration of these habitats. No new mitigation measures are proposed.

2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

PEIR Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas

2019 Updated PEIR Mitigation Measure BIO-18: Compensate for the loss of wetlands and non-wetland waters

If wetlands or non-wetland waters are filled or disturbed as part of a project, the project proponent will compensate for the loss to ensure no net loss of habitat functions and values. Compensation ratios will be based on site-specific information and determined through coordination with state and federal agencies (CDFW, USFWS, USACE). The compensation will be at a minimum 1:1 ratio (1 acre restored or created for every 1 acre filled) and may be a combination of onsite restoration/creation, offsite restoration, and mitigation credits. A restoration and monitoring plan will be developed and implemented. The plan will describe how wetlands will be created and monitored.

Impact BIO-19: Potential impact on the movement of any native resident or migratory wildlife species or established native resident or migratory wildlife corridors, and the use of native wildlife nursery sites (significant and unavoidable)

Many common wildlife species (e.g., ground squirrels, voles, deer, coyote, raccoon, skunk) and special-status wildlife species discussed above are likely to occur in and move through the Project area. Construction activities associated with the Project and fencing of work areas may temporarily impede wildlife movement through the work area or cause animals to travel longer distances to avoid the work area. This could result in higher energy expenditure and increased susceptibility to predation for some species and is a potentially significant impact. Because the construction period for the Project would be up to 9 months, it would likely encompass the movement/migration period for some species (e.g., California tiger salamander movement to/from breeding ponds). In particular, smaller animals, whose energy expenditures to travel around or avoid the area would be greater than for larger animals, could be more severely affected. Upon completion of the Project, the new wind turbines would be spaced apart and would not be a barrier to on-the-ground wildlife movement. Additionally, there would be fewer turbines on the ground, and a net increase in the amount of natural area would result from the restoration of decommissioned turbine pads and foundations. This removal of turbines and increase of natural area would partially compensate for this impact. As discussed above for special-status species, the Project has the potential to affect native wildlife nursery sites (i.e., breeding areas). Because common species may also use these breeding areas, they may also be affected by the Project. This would constitute a significant effect. Implementation of 2019 Updated PEIR Mitigation Measures BIO-1b, BIO-5a, and BIO-8a, and PEIR Mitigation Measures BIO-1e, BIO-3a, BIO-5c, BIO-7a, BIO-8b, and BIO-10a would avoid and minimize potential impacts on wildlife nursery areas for special-status and common wildlife species.

As discussed above, the operation of wind turbines after repowering would adversely affect raptors, other birds, and bats migrating through and wintering in the program area because they could be injured or killed if they fly through the rotor plane of operating wind turbines. As discussed above, this would be a significant and unavoidable impact. Implementation of Mitigation Measures BIO-11b, BIO-11c, BIO-11d, BIO-11e, BIO-11i, BIO-12a, BIO-12b, BIO-14a, and BIO-14d would reduce this impact, but not to a less-than-significant level. Accordingly, this impact would be significant and unavoidable.

2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

PEIR Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas

PEIR Mitigation Measure BIO-3a: Conduct preconstruction surveys for habitat for special-status wildlife species

2019 Updated PEIR Mitigation Measure BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians

PEIR Mitigation Measure BIO-5c: Restore disturbed annual grasslands

PEIR Mitigation Measure BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles

2019 Updated PEIR Mitigation Measure BIO-8a: Implement measures to avoid and minimize potential impacts on special-status and non–special-status nesting birds

PEIR Mitigation Measure BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl

PEIR Mitigation Measure BIO-10a: Implement measures to avoid and minimize potential impacts on San Joaquin kit fox and American badger

PEIR Mitigation Measure BIO-11b: Site turbines to minimize potential mortality of birds

PEIR Mitigation Measure BIO-11c: Use turbine designs that reduce avian impacts

PEIR Mitigation Measure BIO-11d: Incorporate avian-safe practices into design of turbine-related infrastructure

PEIR Mitigation Measure BIO-11e: Retrofit existing infrastructure to minimize risk to raptors

PEIR Mitigation Measure BIO-11i: Implement an avian adaptive management program

PEIR Mitigation Measure BIO-12a: Conduct bat roost surveys

PEIR Mitigation Measure BIO-12b: Avoid removing or disturbing bat roosts

PEIR Mitigation Measure BIO-14a: Site and select turbines to minimize potential mortality of bats

PEIR Mitigation Measure BIO-14d: Develop and implement a bat adaptive management plan

Impact BIO-20: Conflict with local plans or policies (less than significant with mitigation)

The ECAP encourages the preservation of areas known to support special-status species and no net loss of seasonal wetlands. Loss of special-status species and their habitat (Impacts BIO-1 through BIO-14), loss of alkali wetland/drainage (Impact BIO-15), and loss of existing wetlands and drainages (Impact BIO-18) as a result of implementing the Project would be in conflict with these policies. This impact is significant; however, implementation of PEIR Mitigation Measures BIO-1a through BIO-1e, BIO-2, BIO-3a, BIO 5a through 5c, BIO-6, BIO-7a, BIO-8b, BIO-9, BIO 10a, BIO-10b, BIO-11a through BIO-11i, BIO-12b, BIO-14a, BIO-14d, and 2019 Updated PEIR Mitigation Measures BIO-8a, BIO-15, and BIO-18 would reduce this impact to a less-than-significant level, because these measures require the project applicant to minimize impacts on habitat for special-status species and compensate for the permanent loss of suitable habitat, as well as ensure that any impacts on wetlands and drainages are compensated for to ensure no net loss of habitat functions and values.

PEIR Mitigation Measure BIO-1a: Conduct surveys to determine the presence or absence of special-status species

2019 Updated PEIR Mitigation Measure BIO-1b: Implement best management practices to avoid and minimize impacts on special-status species

PEIR Mitigation Measure BIO-1c: Avoid and minimize impacts on special-status plant species by establishing activity exclusion zones

PEIR Mitigation Measure BIO-1d: Compensate for impacts on special-status plant species

PEIR Mitigation Measure BIO-1e: Retain a biological monitor during ground-disturbing activities in environmentally sensitive areas

PEIR Mitigation Measure BIO-2: Prevent introduction, spread, and establishment of invasive plant species

PEIR Mitigation Measure BIO-3a: Implement measures to avoid, minimize, and mitigate impacts on vernal pool branchiopods and curved-footed hygrotus diving beetle

2019 Updated PEIR Mitigation Measure BIO-5a: Implement best management practices to avoid and minimize effects on special-status amphibians

PEIR Mitigation Measure BIO-5b: Compensate for loss of habitat for special-status amphibians

PEIR Mitigation Measure BIO-5c: Restore disturbed annual grasslands

PEIR Mitigation Measure BIO-7a: Implement best management practices to avoid and minimize effects on special-status reptiles

2019 Updated PEIR Mitigation Measure BIO-8a: Implement measures to avoid and minimize potential impacts on special-status and non-special-status nesting birds

PEIR Mitigation Measure BIO-8b: Implement measures to avoid and minimize potential impacts on western burrowing owl

PEIR Mitigation Measure BIO-9: Compensate for the permanent loss of foraging habitat for western burrowing owl

PEIR Mitigation Measure BIO-10a: Implement measures to avoid and minimize potential impacts on San Joaquin kit fox and American badger

PEIR Mitigation Measure BIO-10b: Compensate for loss of suitable habitat for San Joaquin kit fox and American badger

PEIR Mitigation Measure BIO-11a: Prepare a Project-specific avian protection plan

PEIR Mitigation Measure BIO-11b: Site turbines to minimize potential mortality of birds

PEIR Mitigation Measure BIO-11c: Use turbine designs that reduce avian impacts

PEIR Mitigation Measure BIO-11d: Incorporate avian-safe practices into design of turbine-related infrastructure

PEIR Mitigation Measure BIO-11e: Retrofit existing infrastructure to minimize risk to raptors

PEIR Mitigation Measure BIO-11f: Discourage prey for raptors

PEIR Mitigation Measure BIO-11g: Implement postconstruction avian fatality monitoring for all repowering projects

2019 Updated PEIR Mitigation Measure BIO-11h: Compensate for the loss of raptors and other avian species, including golden eagles, by contributing to conservation efforts

PEIR Mitigation Measure BIO-11i: Implement an avian adaptive management program

PEIR Mitigation Measure BIO-12a: Conduct bat roost surveys

PEIR Mitigation Measure BIO-12b: Avoid removing or disturbing bat roosts

PEIR Mitigation Measure BIO-14a: Site and select turbines to minimize potential mortality of bats

PEIR Mitigation Measure BIO-14d: Develop and implement a bat adaptive management plan

2019 Updated PEIR Mitigation Measure BIO-15: Compensate for the loss of alkali wetland/drainage habitat

2019 Updated PEIR Mitigation Measure BIO-18: Compensate for the loss of wetlands and non-wetland waters

Impact BIO-21: Conflict with provisions of an adopted HCP/NCCP or other approved local, regional, or state habitat conservation plan (no impact)

There are no adopted HCP/NCCPs applicable to the Project area. The EACCS, while not a formal HCP, provides guidance for the project planning and permitting process to ensure that impacts are offset in a biologically effective manner. As noted above, the mitigation measures set forth in the PEIR and adopted for this EIR are based on measures from the EACCS, with some modifications and additions. Because there are no adopted HCP/NCCPs for the Project area and the Project would not conflict with the EACCS, there would be no impact.

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3.5 Cultural Resources

This section describes the regulatory and environmental setting for cultural resources. It also describes the impacts on cultural resources that would result from implementation of the Project and mitigation for significant impacts where feasible and appropriate.

3.5.1 Existing Conditions

Regulatory Setting

Federal

National Historic Preservation Act (54 United States Code 300101 et seq.)

The National Historic Preservation Act (NHPA) establishes the federal government policy on historic preservation and the programs, including the National Register of Historic Places (NRHP), through which this policy is implemented. Under the NHPA, significant cultural resources, referred to as historic properties, include any prehistoric or historic district, site, building, structure, object, or landscape included in, or determined eligible for inclusion in, the NRHP. Historic properties also include resources determined to be a National Historic Landmark. National Historic Landmarks are nationally significant historic places designated by the Secretary of the Interior because they possess exceptional value or quality in illustrating or interpreting United States heritage. A property is considered historically significant if it meets one or more of the NRHP criteria and retains sufficient historic integrity to convey its significance. This act also established the Advisory Council on Historic Preservation (ACHP), an independent agency that promotes the preservation, enhancement, and productive use of our nation's historic resources, and advises the President and Congress on national historic preservation policy. The ACHP also provides guidance on implementing Section 106 of the NHPA by developing procedures to protect cultural resources included in, or eligible for inclusion in, the NRHP. Regulations are published in 36 Code of Federal Regulations (CFR) Parts 60, 63, 800.

Section 106 of the NHPA (codified as 36 CFR Part 800) requires that effects on historic properties be taken into consideration in any federal undertaking. The process generally has five steps: (1) initiating Section 106 of the NHPA process, (2) identifying historic properties, (3) assessing adverse effects, (4) resolving adverse effects, and (5) implementing stipulations in an agreement document.

Section 106 of the NHPA affords the ACHP and the State Historic Preservation Officer, as well as other consulting parties, a reasonable opportunity to comment on any undertaking that would adversely affect historic properties. State Historic Preservation Officers administer the national historic preservation program at the state level, review NRHP nominations, maintain data on historic properties that have been identified but not yet nominated, and consult with federal agencies during Section 106 review.

The NRHP eligibility criteria (36 CFR Section 60.4) is used to evaluate significance of potential historic properties. Properties meeting any of the following criteria are considered eligible for listing in the NRHP if they retain integrity of the property’s location, design, setting, materials, workmanship, feeling, or association.

a) Associated with events that have made a significant contribution to the broad patterns of our history.

b) Associated with the lives of persons significant to our past.

c) Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master; or that possess high artistic values; or that represent a significant and distinguishable entity whose components may lack individual distinction.

d) Have yielded, or may be likely to yield, information important in prehistory or history.

Section 101(d)(6)(A) of the NHPA allows properties of traditional religious and cultural importance to a Native American tribe to be determined eligible for NRHP inclusion. In addition, a broader range of Traditional Cultural Properties are also considered and may be determined eligible for or listed in the NRHP. Traditional Cultural Properties are places associated with the cultural practices or beliefs of a living community that are rooted in that community's history and that may be eligible because of their association with cultural practices or beliefs of living communities that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community. In the NRHP programs, "culture" is understood to mean the traditions, beliefs, practices, lifeways, arts, crafts, and social institutions of any community, be it an Indian tribe, a local ethnic group, or the nation as a whole.

State

California Environmental Quality Act (Public Resources Code Section 21000 et seq.)

State CEQA Guidelines Section 15064.5 provides specific guidance for determining the significance of impacts on historic and unique archaeological resources. Under CEQA these resources are called *historical resources* whether they are of historic or prehistoric age. Public Resources Code (PRC) Section 21084.1 defines historical resources as those listed, or eligible for listing, in the California Register of Historical Resources (CRHR), or those listed in the historical register of a local jurisdiction (county or city). NRHP-listed *historic properties* located in California are considered historical resources for the purposes of CEQA and are also listed in the CRHR. The CRHR criteria for listing such resources are based on, and are very similar to, the NRHP criteria. PRC Section 21083.2 and State CEQA Guidelines Section 15064.5(c) provide further definitions and guidance for archaeological sites and their treatment.

State CEQA Guidelines Section 15064.5 also prescribes a process and procedures for addressing the existence of, or probable likelihood of, Native American human remains, as well as the unexpected discovery of any human remains within a project area. This includes consultations with appropriate Native American tribes.

The State CEQA Guidelines define procedures, types of activities, persons, and public agencies required to comply with CEQA. Section 15064.5(b) prescribes that project effects that would "cause a substantial adverse change in the significance of an historical resource" are significant effects on the environment. Substantial adverse changes include physical changes to both the historical resource and its immediate surroundings.

Appendix G of the CEQA Guidelines provides an Environmental Checklist of questions that a lead agency should normally address if relevant to a project's environmental impacts. Section 21083.2 defines *unique archaeological resource*s as "any archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria."

- Contains information needed to answer important scientific research questions and show that there is a demonstrable public interest in that information.
- Exhibits a special and particular quality, such as being the oldest of its type or the best available example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

The CEQA lead agency having jurisdiction over a project is responsible for ensuring that resources are protected in compliance with CEQA and other applicable statutes. PRC Section 21081.6 requires that the CEQA lead agency demonstrate project compliance with mitigation measures developed during the environmental impact review process.

California Register of Historical Resources Sections 5024.1 and 14 California Code of Regulations Section 4850

PRC Section 5024.1 establishes the CRHR. The register lists all California properties considered to be significant historical resources. The CRHR also includes all properties listed or determined eligible for listing in the NRHP, including properties evaluated under Section 106. The criteria for listing are similar to those of the NRHP. The CRHR regulations govern the nomination of resources to the CRHR (14 California Code of Regulations Section 4850). The regulations set forth the criteria for eligibility as well as guidelines for assessing historical integrity and resources that have special considerations.

Public Resources Code Sections 5097.98 and 5097.99

PRC Section 5097.98 discusses the procedures that need to be followed upon the discovery of Native American human remains. The Native American Heritage Commission (NAHC), upon notification of the discovery of human remains by the coroner, is required to notify those persons it believes to be most likely descended from the deceased Native American. It enables the descendant to inspect the site of the discovery of the Native American human remains and to recommend to the landowner (or person responsible for the excavation) means of treating, with dignity, the human remains and any associated grave goods. Furthermore, under Section 5097.99, it is a felony to obtain or possess Native American artifacts or human remains taken from a grave or cairn. Section 5097.99 sets penalties for these actions and also mandates that it is the policy of the State of California to repatriate Native American remains and associated grave goods.

California Health and Safety Code Section 7050.5(b)

This code established that any person who knowingly mutilates, disinters, wantonly disturbs, or willfully removes any human remains in or from any location without authority of the law is guilty of a misdemeanor. It further defines procedures for the discovery and treatment of Native American remains.

Assembly Bill 2641

Assembly Bill (AB) 2641 provides procedures for private landowners to follow up on discovering Native American human remains. Landowners are encouraged to consider culturally appropriate measures if they discover Native American human remains as set forth in PRC Section 5097.98. AB 2641 further clarifies how the landowner should protect the site both immediately after discovery and into the future.

Local

The *Alameda County General Plan* consists of several documents that discuss specific geographic areas in detail in the western part of the county, as well as general goals, policies, and actions for house, safety, conservation, open space, noise, and recreation. In 2012, the Alameda County Board of Supervisors adopted a historic preservation ordinance (Alameda County 2012) that codified the definition and maintenance of the Alameda County Register of Historic Resources, how properties can be added or removed from the county register, and what activities may be subject to review. The ordinance also provided incentives for the preservation of historic resources.

Environmental Setting

The Project area is located along the eastern margin of the Diablo Range of the Coast Ranges geomorphic province (California Geological Survey 2002; U.S. Geological Survey 1977, 1986). The province is characterized by a northwest-trending series of mountain ranges and valleys, is bordered by the Great Valley to the east and the Pacific Ocean to the west, is composed of uplifted Mesozoic-aged (between 250 and 66 million years old) and Cenozoic-aged (less than 66 million years old) sedimentary rock, and runs subparallel to the San Andreas fault (California Geological Survey 2002). Much of the Project area is situated on a range composed of uplifted and faulted upper Cretaceous-aged (between 100 and 66 million years old) to Pliocene-aged (between 5 and 2.5 million years old) silt and sandstone. In a few areas, this range has been dissected by streams, and the resulting valleys have infilled with Holocene-aged (less than 12,000 years old) alluvium (Dibblee and Minch 2006a, 2006b). With the exception of a small number of locations within the Project area that contain Holocene-aged alluvium, nearly all of the soils within the Project area are composed of residuum, which are soils formed as a result of in-situ decomposition (Welch et al. 1966).

Cultural Setting

Prehistoric Period

The Project area is located along the western margin of the Central Valley cultural region of California. Early inhabitants of the Central Valley used the various habitats found throughout the valley, including riparian forest, marsh, alkali basins, oak savanna, and foothill woodland communities. They created a sophisticated material culture and established a trade system involving a wide range of manufactured goods from distant and neighboring regions, and their population and villages prospered in the centuries prior to historic contact (Rosenthal et al. 2007:147, 149). At the time of initial contact with European settlers (between 1773 and 1821), approximately 100,000 people were living in the Central Valley. This represented about one third of the state's native population (Cook 1955, 1976, 1978; Moratto 1984:171). The setting provided below is based on Fredrickson’s (1973, 1974) California adaptation of the Willey and Phillips (1958) prehistoric cultural chronology, and divides this chronology into five periods. These periods are analytical constructs and do not necessarily reflect Native American views.

Paleo-Indian (cal 11,550–8500 B.C.)

Because periodic episodes of erosion and deposition during the Holocene have removed or buried large segments of the Late Pleistocene landscape (Rosenthal and Meyer 2004, White 2003), archaeological deposits that would be associated with these landforms have been either destroyed or buried beneath more recent alluvial deposits (Rosenthal and Meyer 2004, Rosenthal et al. 2007:151, White 2003). Basally thinned and fluted projectile points, found at scattered surface locations primarily in the southern portion of the basin, provide the earliest accepted evidence of human occupation in the Central Valley (Rosenthal et al. 2007:151). No such finds have been reported in the Project vicinity.

Lower Archaic (cal 8500–5550 B.C.)

As with the Paleo-Indian period, the Lower Archaic is not well represented in the Project area. Those Lower Archaic sites that have been identified in the Central Valley are characterized by mostly isolated finds, including stemmed points, chipped stone crescents, and early concave base points, primarily on the ancient shore of Tulare Lake (Fenenga 1992, Wallace and Riddell 1991). No Lower Archaic sites are recorded within the Project area or its vicinity.

Middle Archaic (cal 5550–550 B.C.)

During the Middle Archaic period, significant climate changes spurred two distinct settlement-subsistence adaptations in central California. One was centered on the foothills, and the other was on the valley floor (Fredrickson 1984:102–103). Middle Archaic sites appear to have been increasingly sedentary, as indicated by refined and specialized tool assemblages and features, a wide range of non-utilitarian artifacts, abundant trade objects, and plant and animal remains indicative of year-round occupation (Moratto 1984; Ragir 1972, White 2003).

Upper Archaic (cal 550 B.C.–A.D. 1100)

The Upper Archaic period is characterized by another change in climate conditions, but, during this period, to a cooler, wetter, and more stable climate. New technologies were developed during this period, which included new types of bone tools and bone implements, and widespread manufactured goods such as Haliotis ornaments and ceremonial blades (Bennyhoff and Fredrickson 1994, Fredrickson 1974, Moratto 1984). Sites including human remains displaying extended burial postures have been identified along the side streams and axial marshes of San Joaquin and Merced Counties (Rosenthal et al. 2007:156).

Emergent Occupation (cal A.D. 1000 to Historic Period)

The archaeological record for the Emergent/Historic period is more substantial and comprehensive than those of earlier periods in the Central Valley, and the artifact assemblages are the most diverse (Bennyhoff 1977; Fredrickson 1974; Kowta 1988). The Emergent period is associated with the use of the bow and arrow over the dart and atlatl (Bennyhoff 1994), and increased variation in burial types and furnishings suggests more complex social developments (Atchley 1994, Bennyhoff and Fredrickson 1994).

Ethnographic Period

The Project area is located on the eastern boundary of the Ohlone traditional land and the western edge of the Northern Valley Yokuts traditional area. Both are briefly described below.

Ohlone (Costanoan)

The territory of the Ohlone people extended along the coast from the Golden Gate in the north to just below Carmel to the south, and as far as 60 miles inland. The territory encompassed a lengthy coastline, as well as several inland valleys (Levy 1978:485–486). The Ohlone were hunter-gatherers and relied heavily on acorns, supplementing their diet with a range of other foodstuffs, such as various seeds (the growth of which was promoted by controlled burning), buckeye, berries, roots, mammals, waterfowl, reptiles, and insects (Levy 1978:491–493). Prior to contact, the Ohlone were politically organized by tribelet, with each having a designated territory. A tribelet was an organizational unit consisting of one or more villages with individuals generally numbering 100 to 250 members (Kroeber 1962). Ohlone villages typically had four types of structures: domed dwellings, sweathouses, oval or round dance structures, and a domed assembly house (Crespi 1927:219; Levy 1978:492).

Northern Valley Yokuts

Yokuts is a term applied to a large and diverse number of people inhabiting the San Joaquin Valley and Sierra Nevada foothills of central California. The Northern Valley Yokuts are the historical occupants of the central and northern San Joaquin Valley (Wallace 1978:462). Northern Valley Yokut villages tended to congregate around water sources, and relied heavily on fishing (in particular, salmon fishing). They varied their diet with waterfowl and the harvesting of wild plant food, such as acorns, seeds, and tule root (Wallace 1978:464). Most settlements, or at least the principal ones, were built atop low mounds on or near the banks of large watercourses for protection against spring flooding (Schenck 1926:132; Schenck and Dawson 1929:308; Cook 1960:242, 259, 285). Village populations averaged around 300 people, and villages contained oval or round family houses, a community lodge for dances, and a sweathouse (Wallace 1978:465).

Historic Period

The Project area is located in the hills adjacent to the Altamont Pass, between the cities of Livermore (to the west, in Alameda County) and Tracy (to the east, in San Joaquin County). Accordingly, the historic cultural setting of the Project is associated with the development of those two areas. Throughout the Historic period, the development of infrastructure and evolution of the agrarian economy have been most influential in guiding settlement and land use in this area.

Early Settlement of Livermore Valley and San Joaquin Valley (1769–1850s)

As early as 1769, the Spanish explorer José Francisco Ortega led an expedition through present-day Alameda County. Seven years later, Juan Bautista de Anza and Pedro Font traveled through the region. By 1797, Spain established the Misión del Gloriosísimo Patriarca Señor San José, currently referred to as Mission San Jose, 15 miles northeast of the present-day City of San Jose and approximately 20 miles southwest of the Project location (Kyle et al., 2002).

Under the direction of Father Fermín Lasuen, Mission San Jose prospered as an agricultural center, grazing sheep and cattle on the land now known as Livermore Valley (Kyle et. al. 2002). However, the mission's success came with a heavy cost to the Ohlone population who inhabited the territory. Many Ohlone were forced to live and work at the mission. Introduced disease, harsh living conditions, and reduced birth rates during this period resulted in a population decline. While the Ohlone number around 10,000 when the mission was established, their population diminished to less than 2,000 by 1832 (Cook 1943a, 1943b).

After the missions were secularized by the Mexican government (around 1830), many Native Americans, including Ohlones, left the missions in an attempt to reestablish their previous lives. Many Ohlone found work as wage laborers on the ranchos and mines or in domestic positions. There was a partial return to aboriginal religious practices and subsistence strategies, but for the most part, the Ohlone culture was greatly diminished (Levy 1978:486–487). Today, descendants of the Ohlone still live in the area, and many are active in maintaining their traditions and advocating Native American issues.

With Mexico's independence from Spain in 1822, missions in California were secularized and settlement in Alta California was facilitated through land grants. Rancho land grants were granted in order to encourage agriculture and ranching, reward soldiers, and to provide for settlers who did not own property. Of the more than 800 rancho grants made, the majority were granted by the Mexican government. Between 1841 and 1846, ranchos were established in what would become San Joaquin Valley, including Rancho Pescadero, located in San Joaquin County near present-day Tracy, and Rancho Las Positas, located in the eastern portion of what would become Livermore Valley (Kyle et.al. 2002).

In 1848, the United States defeated Mexico in the Mexican-American War, and Mexico surrendered its Alta California land through the Treaty of Guadalupe Hidalgo. That same year, the Gold Rush brought hundreds of immigrants to Alameda County on their way to the gold fields in California. Attracted by the fertile land and mild climate of the East Bay, many chose to stay and start a new life. The area quickly became one of the leading agricultural hubs of California, with crop farming, dairy farming, and livestock grazing serving as the principal industries of the period (Livermore Heritage Guild 2019a).

Township Development (1860s–1910s)

Tracy

Tracy owes its early development to the introduction of the Central Pacific Railroad. The Altamont line, which extended south from Sacramento, first traversed Altamont Pass in 1869. While development began in the vicinity with the towns of Lathrop and Ellis, Tracy was founded in 1878 at the junction of the Altamont line and the Central Pacific's San Pablo and Tulare line. By the 1880s, Tracy also served as the hub for the Southern Pacific line from Oakland to Martinez and the Southern Pacific line through Los Banos to Los Angeles (Tracy Historical Society 2004:7).

The first buildings in Tracy were moved 3 miles from Ellis. By 1910, a merger of the Central Pacific and Southern Pacific Railroads resulted in relocation of the Southern Pacific headquarters from Lathrop to Tracy. Although this change did not result in the physical relocation of buildings, it did spur introduction of new railroad facilities, such as repair shops and switching yards, as well as residential development, and addition of churches, hotels, saloons, stores, and other community amenities. When the town incorporated as a city in 1910, the population had grown to about 2,000 people (Tracy Historical Society 2004:7–9).

Livermore

Although the town of Livermore was named for Robert Livermore, one of the early settlers in the region who received the Rancho Las Positas land grant in 1839, it was founded in 1869 by William Mendenhall. The town site was established on a 100-acre portion of Mendenhall's property, and 20 acres was provided to Central Pacific Railroad to support routing the transcontinental railroad through Livermore. The establishment of a Western Pacific Railroad line (an independent branch of the Central Pacific Railroad) caused Livermore to quickly become the economic center of the region (Kyle et al. 2002; Nale 2003). In the Livermore Valley, the economy began to shift from livestock to agriculture during the 1850s. Introduction of railroad transportation spurred this trend by providing farmers a means of conveying their harvested crops to markets in the region (Livermore Heritage Guild 2019b).

Altamont

The community of Altamont, where the Project would be located, was founded in 1868 when the Southern Pacific Railroad was established. Altamont primarily functioned as a railroad turnaround for steam engines. Aside from a small number of buildings, which included the Summit School, Summit Hotel, the Summit Garage, and Altamont Library, Altamont was and remains primarily an agrarian community (Nale 2003).

Late-Nineteenth and Twentieth-Century Growth (1910s–1980s)

The region continued to grow slowly during the late nineteenth and early twentieth century. The surrounding area remained primarily an agricultural community populated with ranches and farms. While early settlers had grazed sheep on the unfenced hills and valleys. As livestock became more varied with introduction of cattle, horses, and mules, fencing enclosures became a common feature on the landscape. Cattle ranches began to dominate around World War I, and between 1910 and 1920 Portuguese immigrants settled in the area, launching what would become a robust dairy industry (Tracy Historical Museum 2017; Tracy Historical Society 2004:19, 32).

Without the benefits of irrigation, early settlers in the region first engaged in dry land farming. Although experimentation with plowing depths varying from 2 to 6 inches and use of summer fallowing practices were implemented with some success during this early period, farming flourished when Delta levees and irrigation infrastructure was built. Irrigation in the Tracy area began with the Naglee-Burk Track in 1912, West Side Irrigation District in 1918, and Banta-Carona Irrigation District in 1926. Row crops and orchards, barley, tomatoes, asparagus, nuts, and fruit were cultivated, and associated processing plants were developed (Tracy Historical Society 2004:7–8, 19, 35).

In 1913, transportation was improved with the construction of the Lincoln Highway, which later became known as Highway 50/Altamont Pass Road (William Self Associates 2002:4). The route, located immediately south of the Project's southern boundary, spurred a small degree of development in the immediate vicinity of the Project.

While Tracy's importance as a railroad center declined with the end of the steam era in the 1950s and expanded highway infrastructure, agriculture continued to be an essential industry through the 1950s and the post-World War II era was a period of growth in Livermore Valley. Increased water demands throughout the state spurred planning and development of the California Aqueduct beginning in the 1950s. The structure, designed to redistribute water from the Sacramento-San Joaquin Delta to the southern end of the state at Lake Perris in Riverside County, was 444 miles long, with mainline segments located in Alameda and San Joaquin Counties. A portion of the California Aqueduct south of Bethany Reservoir is located in the Project area. Constructed from 1960 to 1974, the California Aqueduct is the primary delivery system of the State Water Project (Ambacher 2011). As the California Aqueduct was completed, development from the San Francisco Bay sprawled east, and cities such as Livermore and Tracy began to see another pulse of development (Tracy Historical Society 2004:8–9).

Wooden windmills, used to provide reliable water supply for individual farms, were common features in the rural historic landscape throughout the late-nineteenth and early-twentieth centuries. It wasn't until the 1980s that wind began to serve power needs at a regional scale. With winds through the Altamont Pass reaching more than 80 miles per hour, the first modern wind turbine was erected in 1982 (Kyle et al. 2002:24). Although historic aerial photographs and topographic maps confirm the still largely undeveloped setting of the Project area and its immediate vicinity, increased presence of wind turbines and associated infrastructure does accompany cattle ranching uses and increasing suburban development along the Interstate 580 corridor.

3.5.2 Environmental Impacts

This section describes the potential impacts of the proposed Project on cultural resources and describes the methods used to evaluate the impacts and the thresholds used to determine whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts are provided, where feasible and appropriate.

Methods for Analysis

Cultural resources studies for the Project were carried out exclusively by ICF cultural resources staff in 2018. The studies were presented in two documents, one addressing the majority of the current Project area (ICF 2018a) and an addendum addressing an electrical line reroute located outside of the previously identified Project area (ICF 2018b).

Records Search

On January 3, 2018, ICF staff conducted a cultural resources records search (NWIC record 17-1735) at the Northwest Information Center (NWIC) at Sonoma State University in Rohnert Park. The records search covered the Project area and 0.25-mile buffer around the Project area. The purpose was to identify any previously recorded cultural resources in the Project vicinity. Also included in the search were previous cultural resources studies that have included portions of the Project area or areas within the 0.25-mile buffer.

The records search was performed using data from the following sources.

- NRHP.
- CRHR.
- Office of Historic Preservation's Directory of Properties in the Historic Property Data File.
- Office of Historic Preservation's Archeological Determinations of Eligibility (April 5, 2012).

The records search resulted in the identification of three previously recorded cultural resources within the Project area: P-01-010613, P-01-010947, and P-01-011395. Resource P-01-010613 is a previously recorded segment of Grant Line Road that runs along the route of the original Lincoln Highway, the first paved transcontinental road constructed in approximately 1870. Resource P-01-010947 is the Pittsburg-Tesla 230kV transmission line. It was constructed by Pacific Gas and Electric Company (PG&E) in 1959 and 1960 and extends for approximately 31 miles across eastern Contra Costa County and northeastern Alameda County. Resource P-01-011395 is a 6-mile segment of the PG&E Tracy-Tesla 230kV transmission line built between 1949 and 1953. In addition to the previously recorded resources, the NWIC lists a total of 11 cultural resources studies that were performed within the Project area, nine of which also extended into the 0.25-mile buffer. An additional 25 cultural resources studies have been recorded within the 0.25-mile buffer.

Additional Literature Search

Additional sources consulted included 7.5-minute series topographic maps (1907, 1914, 1929, 1941, 1969, and 1975) and aerial photographs (1949, 1959, 1979, 1993, and 2010). The historic aerial photographs and topographic maps reviewed did not indicate the presence of historic structures in the immediate vicinity of Project component locations. However, historic topographic maps (1914, 1916, 1941, 1943, 1955, and 1966) suggest the presence of several roads travelling across the northeast portion of the Project area. This roadway is not seen on maps after 1966, perhaps due to the construction of the Bethany Reservoir, adjacent to the Project area.

Native American Outreach

ICF contacted the NAHC on January 24, 2018, to identify any areas of concern within the Project that may be listed in the NAHC's Sacred Land File. No responses were received from the initial request. Another request was sent January 25, 2019. The NAHC responded on January 28, 2019 stating that no Sacred Lands were identified within the Project area.

Field Survey

From February 19 to 21, and on September 18, 2018, ICF cultural resources staff—J. Tait Elder, January Tavel, Kerry Boutte, Lily Arias, Jon Rusch, and Andrea Duomovich—conducted pedestrian surveys of the Project area. When possible, transect spacing of no more than approximately 10 meters was used to provide a high degree of ground coverage. The locations of subsurface exposures caused by such factors as rodent activity, off-road vehicle ruts, road cuts, or vegetation disturbances were examined for artifacts or for indications of buried deposits. No subsurface investigations or artifact collection occurred during the pedestrian survey.

All three resources previously documented in the Project area (P-01-010613, P-01-010947, and P-01-011395) were relocated during the pedestrian survey. The portions of these resources that intersect with the Project area consist of overhead power transmission lines and actively in-use roadway. Although the Project would interconnect with the power transmission lines and use the existing roadway, these activities are consistent with the resources' current use and function. No previously undocumented archaeological resources were identified within the Project area during the pedestrian survey. Based on this information, none of the resources identified above were evaluated for NRHP/CRHR Eligibility under Criteria A/1, B/2, C/3, or D/4.

A portion of the California Aqueduct main line does intersect with the Project area at two locations south of Bethany Reservoir. Segments of the California Aqueduct have been evaluated for NRHP/CRHR eligibility in other locations. The full extent of the aqueduct has been determined eligible for listing on the NRHP and CRHR at the state level of significance under NRHP/CRHR Criterion A/1 for representing a comprehensively planned and publicly sanctioned water conveyance public works project that facilitated development throughout the state. The full extent also has been determined eligible for listing under NRHP/CRHR Criterion C/3 for introducing design innovations to water conveyance infrastructure. Because Project activities are not anticipated to disturb this infrastructure, evaluation of the aqueduct was not included in the scope of this survey.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the proposed Project would be considered to have a significant effect if it would result in any of the conditions listed below.

- A substantial adverse change in the significance of a historical resource pursuant to Section 15064.5.
- A substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5.
- Disturbance of any human remains, including those interred outside of formal cemeteries.

Impacts and Mitigation Measures

Program Changes

The changes in the project described in Chapter 2 would not result in any changes in the location of program elements on areas containing cultural resources. For this reason, there would be no changes to the program impacts from those presented in the PEIR.

Project Impacts

Impact CUL-1: Potential to cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5 (no impact)

Three historic resources were identified within the Project area: P-01-010613 (Grant Line Road) and P-01-010947 and P-01-011395 (both historic transmission lines). These resources were not formally evaluated for eligibility in either the NRHP or the CRHR. However, Grant Line Road is an actively used roadway, and the transmission lines consist of overhead power lines. These resources would not be affected by Project activities. Similarly, although a segment of the California Aqueduct is located in the Project area, Project-related activities would not change, disturb, or modify the aqueduct. The Project would include a generation-tie line that would cross over the aqueduct using an overhead electrical line on poles or connecting conduit to an existing bridge, or it would cross under the aqueduct using directional boring. Directional boring would not affect the aqueduct. Attaching conduit to an existing bridge would not change the function or design of the bridge and, therefore, would not affect the integrity of the overall aqueduct. Because an overhead electrical line is already present, the generation-tie line would not change the existing conditions and would not change the integrity of the overall aqueduct. Accordingly, the Project would not cause a substantial adverse change in the significance of a historical resource. There would be no impact, and no mitigation is required.

Impact CUL-2: Potential to cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5 (less than significant with mitigation)

No previously undocumented archaeological resources were identified within the Project area during the pedestrian survey.

Although the Project area and vicinity may have been used by prehistoric peoples, the nature of this land use would primarily have been resource collection. Consequently, the expected range of prehistoric artifact and feature types in the Project area includes projectile points and lithic tools, lithic debitage, bedrock mortars, and grinding stones. Although the area could have been used for upland resource collection activities, the Project area is located far from permanent water sources and is, therefore, expected to have moderate to low potential to contain prehistoric archaeological resources.

In the event that archaeological resources are inadvertently uncovered during Project construction, implementation of PEIR Mitigation Measures CUL-2c, *Conduct worker awareness training for archaeological resources prior to construction;* and CUL-2d, *Stop work if cultural resources are encountered during ground-disturbing activities*, would reduce this impact to a less-than-significant level.

PEIR Mitigation Measure CUL-2c: Conduct worker awareness training for archaeological resources prior to construction

Prior to the initiation of any site preparation and/or the start of construction, the Project applicant will ensure that all construction workers receive training overseen by a qualified professional archaeologist who is experienced in teaching nonspecialists, to ensure that forepersons and field supervisors can recognize archaeological resources (e.g., areas of shellfish remains, chipped stone or groundstone, historic debris, building foundations, human bone) in the event that any are discovered during construction.

PEIR Mitigation Measure CUL-2d: Stop work if cultural resources are encountered during ground-disturbing activities

The Project applicant will ensure that construction specifications include a stop-work order if prehistoric or historic-era cultural resources are unearthed during ground-disturbing activities. If such resources are encountered, the Project applicant will immediately halt all activity within 100 feet of the find until a qualified archaeologist can assess the significance of the find. Prehistoric materials might include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or tool-making debris; culturally darkened soil ("midden") containing heat-affected rocks and artifacts; stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered-stone tools, such as hammerstones and pitted stones. Historic-period materials might include stone, concrete, or adobe footings and walls; filled wells or privies; and deposits of metal, glass, and/or ceramic refuse. If the find is determined to be potentially significant, the archaeologist, in consultation with the Native American representative (if appropriate), will develop a treatment plan that could include site avoidance, capping, or data recovery.

Impact CUL-3: Disturbance of any human remains, including those interred outside of dedicated cemeteries (less than significant with mitigation)

There are no known formal cemeteries within the Project area, and neither the results of the records search nor the pedestrian surveys indicated that human remains are present in the Project area. However, there is always the possibility that ground-disturbing activities during construction may uncover previously unknown buried human remains. This impact would be potentially significant. However, implementation of PEIR Mitigation Measure CUL-3, *Stop work if human remains are* *encountered during ground-disturbing activities*, would reduce the impact to a less-than-significant level.

PEIR Mitigation Measure CUL-3: Stop work if human remains are encountered during ground-disturbing activities

The Project applicant will ensure the construction specifications include a stop-work order if human remains are discovered during construction or demolition. There will be no further excavation or disturbance of the site within a 100-foot radius of the location of such discovery, or any nearby area reasonably suspected to overlie adjacent remains. The Alameda County Coroner will be notified and will make a determination as to whether the remains are Native American. If the Coroner determines that the remains are not subject to the coroner's authority, the coroner will notify the Native American Heritage Commission, who will attempt to identify descendants of the deceased Native American. If no satisfactory agreement can be reached as to the disposition of the remains pursuant to this state law, then the landowner will re-inter the human remains and items associated with Native American burials on the property in a location not subject to further subsurface disturbance. A final report will be submitted to Alameda County. This report will contain a description of the mitigation program and its results, including a description of the monitoring and testing resources analysis methodology and conclusions and a description of the disposition/curation of the resources.

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3.6 Energy

This section describes the regulatory and environmental setting for energy related to the Project.

3.6.1 Existing Conditions

Regulatory Setting

The following California State Senate bills apply to energy in the inventory area.

Senate Bills 1078, 107, and 2—Renewables Portfolio Standard (2011)

Senate Bills (SBs) 1078 (2002), 107 (2006), and 2 (2011), California's Renewables Portfolio Standard (RPS), obligate investor-owned utilities, energy service providers, and Community Choice Aggregators to procure additional retail sales per year from eligible renewable sources with the target of procuring 33% of retail sales from renewable resources by 2020. California Public Utilities Commission and California Energy Commission are jointly responsible for implementing the program.

Senate Bill 100—The 100 Percent Clean Energy Act of 2018 (2018)

SB 100 builds on SB 350, the Clean Energy and Pollution Reduction Act of 2015, which required the following by 2030: (1) an RPS of 50% and (2) a doubling of energy efficiency (electrical and natural gas) by 2030, including improvements to the efficiency of existing buildings. SB 100 increases the 2030 RPS target set in SB 350 to 60% and requires an RPS of 100% by 2045.

Environmental Setting

Existing uses in the Project area consist largely of cattle-grazed land, and previously operating wind turbines and ancillary facilities. No substantial energy demands are generated by existing uses.

3.6.2 Environmental Impacts

Pacific Gas and Electric Company (PG&E) provides electricity and natural gas service to the Project area. The existing facility transmits energy from the site to the regional power grid through a power purchase agreement with PG&E. PG&E maintains transmission and distribution lines throughout Alameda County. Some homes are powered by solar or other systems and might feed electricity into the grid.

Methods for Analysis

Assessment of energy impacts was done based on Appendix F and Appendix G of the State CEQA Guidelines.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the proposed Project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Wasteful, inefficient, or unnecessary consumption of energy resources during Project construction or operations.
- Conflict with or obstruction of a state or local plan for renewable energy or energy efficiency.

Impacts and Mitigation Measures

Impact EN-1: Wasteful, inefficient, or unnecessary consumption of energy resources during Project construction or operation (less than significant with mitigation)

Construction

Project construction would require use a variety of construction equipment, including heavy equipment, excavator, trucks, graders, and a track-mounted crane. The Project encompasses up to six phases. Most of the energy would be consumed during road construction, foundation and electrical installation, and turbine delivery and installation.

Although substantial amounts of energy would be used in construction of the Project, implementation of PEIR Mitigation Measures AQ-2a and AQ-2b, and 2019 NEW Mitigation Measure AQ-2c would reduce the amount of energy used by construction equipment, reducing energy use to a less-than-significant impact.

PEIR Mitigation Measure AQ-2a: Reduce construction-related air pollutant emissions by implementing applicable BAAQMD Basic Construction Mitigation Measures

PEIR Mitigation Measure AQ-2b: Reduce construction-related air pollutant emissions by implementing measures based on BAAQMD's Additional Construction Mitigation

2019 NEW Mitigation Measure AQ-2c: Reduce construction-related air pollutant emissions to below BAAQMD NO_x thresholds

Operation

In 2025, California is expected to generate between approximately 71,000 and 76,700 MW, while demand is expected to range from nearly 61,000 to 68,000 MW (California Energy Commission 2019). During operations, the Project would produce electricity via wind power which would help offset California's energy demands. Therefore, potential energy impacts of Project operation would be less than significant and no mitigation is necessary.

Impact EN-2: Conflict with or obstruction of a state or local plan for renewable energy or energy efficiency (no impact)

The Project would not obstruct state or local plans for renewable energy or energy efficiency. Rather, the project entails installation of wind turbines that would increase available renewable energy and assist California in meeting its RPS, GHG reduction, and carbon neutrality goals. There would be no impact. No mitigation is required.

3.6.3 References Cited

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3.7 Geology, Soils, Mineral Resources, and Paleontological Resources

This section describes the regulatory and environmental setting for geology, soils, mineral resources, and paleontological resources in the Project area. It also describes impacts on geology, soils, mineral resources, and paleontological resources that would result from implementation of the Project. Mitigation measures are prescribed where feasible and appropriate.

3.7.1 Existing Conditions

Regulatory Setting

No federal regulations apply to mineral resources or paleontological resources in the Project area. The following federal regulations are related to geologic hazards or soils.

International Building Code

The design and construction of engineered facilities in California must comply with the requirements of the International Building Code (IBC) and the adoptions of that code by the State of California (see *California Building Standards Code* in the *State* subsection).

U.S. Geological Survey Landslide Hazard Program

To fulfill the requirements of Public Law 106-113, the U.S. Geological Survey (USGS) created the National Landslide Hazards Program to reduce long-term losses from landslide hazards by improving understanding of the causes of ground failure and suggesting mitigation strategies. The Federal Emergency Management Agency is the responsible agency for the long-term management of natural hazards.

Clean Water Act Section 402 (National Pollutant Discharge Elimination System Program)

Section 402 of the Clean Water Act (CWA) mandates that certain types of construction activity comply with the requirements of the U.S. Environmental Protection Agency's (EPA's) National Pollutant Discharge Elimination System (NPDES) program. EPA has delegated to the State Water Resources Control Board the authority for the NPDES program in California, where it is implemented by the state's nine Regional Water Quality Control Boards. Construction activity disturbing at least 1 acre must obtain coverage under the state's General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order 2010-0014-DWQ). (See *Construction Activities Storm Water Construction General Permit [2010-0014-DWQ Permit]*).

Additional details of the CWA are described in Section 3.10, *Hydrology and Water Quality*.

State

Alquist-Priolo Earthquake Fault Zoning Act

California's Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) (Public Resources Code [PRC] Section 2621 et seq.) is intended to reduce risks to life and property from surface fault rupture during earthquakes. The Alquist-Priolo Act prohibits the location of most types of structures intended for human occupancy[1] across the traces of active faults and strictly regulates construction in the corridors along active faults capable of surface rupture or fault creep (earthquake fault zones). Generally the required setback is 50 feet from an active fault trace. The act also defines criteria for identifying active faults, giving legal weight to terms such as *active*, and establishes a process for reviewing building proposals in and adjacent to earthquake fault zones.

Under the Alquist-Priolo Act, faults are zoned, and construction along or across them is strictly regulated if they are *sufficiently active* and *well defined*. A fault is considered sufficiently active if one or more of its segments or strands shows evidence of surface displacement during Holocene time (defined for purposes of the act as referring to approximately the last 11,700 years). A fault is considered well-defined if its trace can be identified clearly by a trained geologist at the ground surface, or in the shallow subsurface using standard professional techniques, criteria, and judgment (Bryant and Hart 2018).

Seismic Hazards Mapping Act

Like the Alquist-Priolo Act, the Seismic Hazards Mapping Act of 1990 (PRC Sections 2690–2699.6) is intended to reduce damage resulting from earthquakes. While the Alquist-Priolo Act addresses surface fault rupture, the Seismic Hazards Mapping Act addresses other earthquake-related hazards, including strong ground shaking, liquefaction, and seismically induced landslides. Its provisions are similar in concept to those of the Alquist-Priolo Act—the state is charged with identifying and mapping areas at risk of strong ground shaking, liquefaction, landslides, and other corollary hazards; and cities and counties are required to regulate development within mapped seismic hazard zones.

Under the Seismic Hazards Mapping Act, permit review is the primary mechanism for local regulation of development. Specifically, cities and counties are prohibited from issuing development permits for sites within seismic hazard zones until appropriate site-specific geologic and/or geotechnical investigations have been carried out and measures to reduce potential damage have been incorporated into the development plans. Geotechnical investigations conducted within seismic hazard zones must incorporate standards specified by California Geological Survey Special Publication 117a, *Guidelines for Evaluating and Mitigating Seismic Hazards in California* (California Geological Survey 2008a).

Construction Activities Storm Water Construction General Permit (2010-0014-DWQ Permit)

Stormwater dischargers whose projects disturb at least 1 o acre of soil, or whose projects disturb less than 1 acre but are part of a larger common plan of development that in total disturbs at least 1 acre, are required to obtain coverage under the General Permit Order 2010-0014-DWQ.

[1] With reference to the Alquist-Priolo Act, a *structure for human occupancy* is defined as one "used or intended for supporting or sheltering any use or occupancy, which is expected to have a human occupancy rate of more than 2,000 person-hours per year" (California Code of Regulations, Title 14, Div. 2, Section 3601[e]).

Construction activity subject to this permit includes clearing, grading, and disturbances to the ground such as stockpiling or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility.

Coverage under the General Permit is obtained by submitting permit registration documents to the State Water Resources Control Board that include a risk level assessment and a site-specific stormwater pollution prevention plan (SWPPP) identifying an effective combination of erosion control, sediment control, and non-stormwater best management practices (BMPs). The General Permit requires that the SWPPP define a program of regular inspections of the BMPs and, in some cases, sampling of water quality parameters. The San Francisco Bay Regional Water Quality Control Board administers the NPDES stormwater permit program in Alameda County. The 14 cities, the county, and the two flood control districts of Alameda County share one NPDES permit that is managed through a consortium of agencies called the Alameda Countywide Clean Water Program.

California Building Standards Code

The California Building Standards Code (CBSC) (24 California Code of Regulations) provides the minimum standards for structural design and construction. The CBSC is based on the IBC, which is used widely throughout United States (generally adopted on a state-by-state or district-by-district basis) and has been modified for California conditions with numerous, more detailed or more stringent regulations. The CBSC requires that "classification of the soil at each building site will be determined when required by the building official" and that "the classification will be based on observation and any necessary test of the materials disclosed by borings or excavations." In addition, the CBSC states that "the soil classification and design-bearing capacity will be shown on the (building) plans, unless the foundation conforms to specified requirements." The CBSC provides standards for various aspects of construction, including (i.e., not limited to) excavation, grading, and earthwork construction; fills and embankments; expansive soils; foundation investigations; and liquefaction potential and soil strength loss. In accordance with California law, certain aspects of the Project would be required to comply with all provisions of the CBSC.

The CBSC requires extensive geotechnical analysis and engineering for grading, foundations, retaining walls, and other structures, including criteria for seismic design.

California Surface Mining and Reclamation Act of 1975

The principal legislation addressing mineral resources in California is the Surface Mining and Reclamation Act of 1975 (SMARA) (PRC Sections 2710–2719), which was enacted in response to land use conflicts between urban growth and essential mineral production. The stated purpose of SMARA is to provide a comprehensive surface mining and reclamation policy that will encourage the production and conservation of mineral resources while ensuring that adverse environmental effects of mining are prevented or minimized; to ensure that mined lands are reclaimed and residual hazards to public health and safety are eliminated; and to give consideration to recreation, watershed, wildlife, aesthetic, and other related values. SMARA governs the use and conservation of a wide variety of mineral resources, although some resources and activities are exempt from its provisions, including excavation and grading conducted for farming, construction, or recovery from flooding or other natural disaster.

SMARA provides for the evaluation of an area's mineral resources using a system of Mineral Resource Zone (MRZ) classifications that reflect the known or inferred presence and significance of a given mineral resource. The MRZ classifications are based on available geologic information, including geologic mapping and other information on surface exposures, drilling records, and mine data, and on socioeconomic factors such as market conditions and urban development patterns. The MRZ classifications are defined as follows.

- **MRZ-1**—areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence.
- **MRZ-2**—areas where adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood for their presence exists.
- **MRZ-3**—areas containing mineral deposits, the significance of which cannot be evaluated from available data.
- **MRZ-4**—areas where available information is inadequate for assignment into any other MRZ.

Although the State of California is responsible for identifying areas containing mineral resources, the county or city is responsible for SMARA implementation and enforcement by providing annual mining inspection reports and coordinating with the California Geological Survey (CGS).

Mining activities that disturb more than 1 acre or involve excavation of at least 1,000 cubic yards of material require a SMARA permit from the lead agency, which is the county, city, or board that is responsible for ensuring that adverse environmental effects of mining are prevented or minimized. The lead agency establishes its own local regulations and requires a mining applicant to obtain a surface mining permit, submit a reclamation plan, and provide financial assurances pursuant to SMARA.

Certain land-disturbing activities do not require a permit, such as excavation related to farming, grading related to restoring the site of a natural disaster, and grading related to construction.

California Public Resources Code

Several PRC sections protect paleontological resources. Section 5097.5 prohibits "knowing and willful" excavation, removal, destruction, injury, and defacement of any paleontological feature on public lands (lands under state, county, city, district, or public authority jurisdiction, or the jurisdiction of a public corporation), except where the agency with jurisdiction has granted express permission. Section 30244 requires reasonable mitigation for impacts on paleontological resources that result from development on public lands.

Local

The policies and regulations of the county government that address issues related to geology, such as seismic hazards, slope stability, and erosion, and mineral resources are found in the Alameda General Plan, the *East County Area Plan* (ECAP), the Alameda County Code of Ordinances, and the Alameda County Stormwater Management Plan and are described below. There are no general plan policies related to paleontological resources.

Alameda County General Plan

The Safety Element of the *Alameda County General Plan* specifies numerous policies and action to meet its relevant goal, which is, "To minimize risks to lives and property due to seismic and geologic hazards." These policies and actions are listed below (Alameda County Community Development Agency 2014).

Policies

P1. To the extent possible, projects should be designed to accommodate seismic shaking and should be sited away from areas subject to hazards induced by seismic shaking (landsliding, liquefaction, lurking, etc.) where design measures to mitigate the hazards will be uneconomic or will not achieve a satisfactory degree of risk reduction. (Source: Seismic Safety and Safety Element, pg. 6)

P2. Structures should be located at an adequate distance away from active fault traces, such that surface faulting is not an unreasonable hazard. (Source: Seismic Safety and Safety Element, pg. 6)

P3. Aspects of all development in hillside areas, including grading, vegetation removal and drainage, should be carefully controlled in order to minimize erosion, disruption to natural slope stability, and landslide hazards. (Source: Seismic Safety and Safety Element, pg. 6)

P4. Within areas of demonstrated or potential slope instability, development should be undertaken with caution and only after existing geological and soil conditions are known and considered. In areas subject to possible widespread major landsliding, only very low density development should be permitted, consistent with site investigations; grading in these areas should be restricted to minimal amounts required to provide access. (Source: Seismic Safety and Safety Element, pg. 7)

P5. All existing structures or features of structures which are hazardous in terms of damage, threat to life or loss of critical and essential function in the event of an earthquake should be, to the extent feasible, brought into conformance with applicable seismic and related safety (fire, toxic materials storage and use) standards through rehabilitation, reconstruction, demolition, or the reduction in occupancy levels or change in use. (Source: Seismic Safety and Safety Element, pg. 7, with a minor revision)

P6. The County shall not approve new development in areas with potential for seismic and geologic hazards unless the County can determine that feasible measures will be implemented to reduce the potential risk to acceptable levels, based on site-specific analysis. The County shall review new development proposals in terms of the risk caused by seismic and geologic activity. (Source: ECAP, pg. 74)

P7. The County, prior to approving new development, shall evaluate the degree to which the development could result in loss of lives or property, both within the development and beyond its boundaries, in the event of a natural disaster. (Source: ECAP, pg. 74)

P8. The County shall ensure that new major public facilities, including emergency response facilities (e.g., hospitals and fire stations), and water storage, wastewater treatment and communications facilities, are sited in areas of low geologic risk. (Source: ECAP, pg. 74)

P9. Site specific geologic hazard assessments, conducted by a licensed geologist21, shall be completed prior to development approval in areas with landslide and liquefaction hazards as indicated in Figures S-2 and S-4 and for development proposals submitted in Alquist-Priolo Zones as indicated in Figure S-1, hazards to be mapped include:

- Seismic features
- Landslide potential
- Liquefaction potential

Mitigation measures needed to reduce the risk to life and property from earthquake induced hazards should be included. (Source: Eden Area Plan, pg. 8-11)

P10. Buildings shall be designed and constructed to withstand ground shaking forces of a minor earthquake (1-4 magnitude) without damage, of a moderate (5 magnitude) earthquake without structural damage, and of a major earthquake (6-8 magnitude) without collapse of the structure. The County shall require that critical facilities and structures (e.g. hospitals, emergency operations centers) be designed and constructed to remain standing and functional following an earthquake. (Source: ECAP, pg. 75)

P11. All construction in unincorporated areas shall conform to the Alameda County Building Ordinance, which specifies requirements for the structural design of foundations and other building elements within seismic hazard areas.

P12. To the extent feasible, major infrastructure including transportation, pipelines, and water and natural gas mains, shall be designed to avoid or minimize crossings of active fault traces and to accommodate fault displacement without major damage that could result in long-term service disruptions. (Source: Eden Area Plan, pg. 8-12)

P13. The County shall encourage the retrofitting of existing structures and other seismically unsafe buildings and structures to withstand earthquake ground-shaking. (Source: Eden Area Plan, pg. 8-12)

P14. In order to minimize off-site impacts of hillside development, new construction on landslide-prone or potentially unstable slopes shall be required to implement drainage and erosion control provisions to avoid slope failure and mitigate potential hazards. (Source: Eden Area Plan, pg. 8-12)

Actions

A1. Require all new construction to meet the most current, applicable, lateral force requirements. (Source: Seismic Safety and Safety Element, pg. 6)

A2. Require applications for development within Alquist-Priolo Study Zones to include geological data that the subject property is not traversed by an active or potentially active fault, or that an adequate setback can be maintained between the fault trace and the proposed new construction. (Source: Seismic Safety and Safety Element, pg. 6)

A3. Require sites to be developed in accordance with recommendations contained in the soil and geologic investigations reports. (Source: Seismic Safety and Safety Element, pg. 6)

A4. Establish standards for areas previously in Alquist-Priolo Study Zones, and eliminated in the last update. (Source: Seismic Safety and Safety Element, pg. 6)

A5. Regulate, with collaboration from utility owners, the extension of utility lines in fault zones. (Source: Seismic Safety and Safety Element, pg. 6, with minor revisions) **A6.** Establish (with collaboration from utility owners) and enforce design standards for transportation facilities and underground utility lines to be located in fault zones. (Source: Seismic Safety and Safety Element, pg. 6)

A7. Require soils and/or geologic reports for development proposed in areas of erodible soils and potential slope instability. (Source: Seismic Safety and Safety Element, pg. 7)

A8. Pursue programs to identify and correct existing structural hazards, with priority given to hazards in critical, essential and high occupancy structures and in structures built prior to the enactment of applicable local or state earthquake design standards. (Source: Seismic Safety and Safety Element, pg. 7)

A9. Support regional or statewide programs providing funding or technical assistance to local governments to allow identification of existing structural hazards in private development and providing assistance to public and private sectors to facilitate and to minimize the social and economic costs of hazards abatement. (Source: Seismic Safety and Safety Element, pg. 7)

A10. Continue to require the upgrading of buildings and facilities to achieve compliance with current earthquake bracing requirements as a condition of granting building permits for major additions and repairs. (Source: Seismic Safety and Safety Element, pg. 7)

A11. Continue, and as required, expand programs to provide the public information regarding seismic hazards and related structural hazards. (Source: Seismic Safety and Safety Element, pg. 7)

A12. Require geotechnical studies prior to development approval in geologic and/or seismic hazard areas as identified by future studies by federal, state, and regional agencies.

Require or undertake comprehensive geologic and engineering studies for critical structures regardless of location. (Source: Castro Valley Plan, pg. 10-30)

A13. Adopt and amend as needed the most current version of the California Building Code (CBC) to ensure that new construction and renovation projects incorporate Earthquake resistant design and materials that meet or exceed the current seismic engineering standards of the CBC. (Source: Castro Valley Plan, pg. 10-30, with minor revision)

A14. Periodically update detailed guidelines for preparation of site-specific geologic hazard assessments. These guidelines shall be prepared in consultation with the County Building Official, County Engineer, County Counsel and the County Risk Manager and shall ensure that site-specific assessments for development requiring discretionary permits are prepared according to consistent criteria. (Source: Eden Area Plan, pg. 8-13, with revisions)

A15. Develop and implement an earthquake retrofit plan to reduce hazards from earthquakes. The plan should identify and tally the seismically unsafe buildings and structures, including unreinforced masonry, unreinforced concrete and soft-story buildings, and require inspection for these structures. It should also identify sources of funding to help reconstruct or replace inadequate structures and assist homeowners with earthquake retrofitting. (Source: Eden Area Plan, pg. 8-13)

A16. On sites with slopes greater than 30 percent, require all development to be clustered outside of the 30 percent slope area. (Source: Castro Valley Plan, pg. 10-31) With the exception that development22 upon any area outside of the Urban Growth Boundary where the slope exceeds 25% shall not be permitted. (Source: ECAP, pg. 74)

A17. Aspects of all development in hillside areas, including grading, vegetation removal and drainage, should be carefully controlled in order to minimize erosion, disruption to natural slope stability, and landslide hazards. The County's development standards and guidelines, permit application review process, Section 15.08.240 of its Building Ordinance, the Grading Erosion and Sediment Control Ordinance (Chapter 15.36 of the Alameda County General Ordinance Code), the Stormwater Management and Discharge Control Ordinance (Chapter 13.08), and Subdivision Ordinance (Title 16) shall serve to implement this policy.

Alameda County Code of Ordinances

In the Code of Ordinances, Chapter 15.08, *Building Code*, the County sets forth requirements for new construction in areas affected by seismic and geologic hazards. The code requires that project proponents submit soil and geotechnical reports before the County will permit construction of a foundation. In addition, Chapter 15.36, *Grading Erosion and Sediment Control*, known as the grading ordinance, sets forth requirements for grading, construction, and the control of erosion and sediments in order to safeguard human health and property, protect waterways, and ensure that the graded site is prepared in accordance with the general plan.

Alameda County Stormwater Management Plan

The Alameda Countywide Clean Water Program's Stormwater Management Plan for unincorporated Alameda County is discussed in Section 3.10, *Hydrology and Water Quality*.

Alameda County East County Area Plan

The ECAP sets forth the following goals, policies, and implementation programs to minimize the risks related to seismic hazards (Alameda County 2000) and open space.

Hazard Zones

Goal: To minimize the risks to lives and property due to environmental hazards.

Policy 134: The County shall not approve new development in areas with potential **natural hazards** (flooding, geologic, wildland fire, or other environmental hazards) unless the County can determine that feasible measures will be implemented to reduce the potential risk to acceptable levels, based on site-specific analysis.

Policy 135: The County, prior to approving new development, shall evaluate the degree to which the development could result in loss of lives or property, both within the development and beyond its boundaries, in the event of a **natural disaster**.

Environmental Hazards

Soil and Slope Stability

Goal: To minimize the risks to lives and property due to soil and slope instability hazards.

Policy 307: The County shall encourage Zone 7, cities, and agricultural groundwater users to limit the withdrawal of groundwater in order to minimize the potential for **land subsidence**.

Policy 308: The County shall not permit development within any area outside the Urban Growth Boundary exceeding 25 percent slopes to minimize hazards associated with slope instability.

Seismic and Geologic Hazards

Goal: To minimize the risks to lives and property due to seismic and geologic hazards.

Policy 309: The County shall not approve new development in areas with potential for seismic and geologic hazards unless the County can determine that feasible measures will be implemented to reduce the potential risk to acceptable levels, based on site-specific analysis. The County shall review new development proposals in terms of the risk caused by seismic and geologic activity.

Policy 310: The County, prior to approving new development, shall evaluate the degree to which the development could result in loss of lives or property, both within the development and beyond its boundaries, in the event of a **natural disaster.**

Policy 311: The County shall ensure that new major public facilities, including emergency response facilities (e.g., hospitals and fire stations), and water storage, wastewater treatment and communications facilities, are sited in areas of low geologic risk.

Policy 312: The County shall ensure that major transportation facilities and pipelines are designed, to the extent feasible, to avoid or minimize crossings of active fault traces and to accommodate fault displacement without major damage that could result in long-term disruption of service.

Policy 313: The County shall require development in **hilly areas** to minimize potential erosion and disruption of natural slope stability which could result from grading, vegetation removal, irrigation, and drainage.

Policy 314: The County shall prohibit the construction of any structure intended for human occupancy within 50 feet on either side of the Calaveras, Greenville, or Verona earthquake fault zones as defined by the Alquist-Priolo Earthquake Fault Zoning Act.

Policy 315: The County shall require that buildings be designed and constructed to withstand **groundshaking forces** of a minor earthquake without damage, of a moderate earthquake without structural damage, and of a major earthquake without collapse of the structure. The County shall require that critical facilities and structures (e.g., hospitals, emergency operations centers) be designed and constructed to remain standing and functional following an earthquake.

Implementation Programs:

Program 111: The County shall delineate areas within East County where the potential for geologic hazards (including seismic hazards, landslides, and liquefaction) warrants preparation of detailed site specific geologic hazard assessments. Areas shall be delineated based upon data from published sources and field investigations. Maps shall be maintained and updated as new data become available. These maps shall not be used by the County to determine where hazardous conditions exist, but instead to identify the presence of conditions which warrant further study.

Program 112: The County shall develop detailed guidelines for preparation of site-specific geologic hazard assessments. These guidelines shall be prepared in consultation with the County Building Official, the County Engineer, County Geologist, County Counsel, and the County Risk Manager, and shall ensure that site-specific assessments for development requiring discretionary permits are prepared according to consistent criteria.

General Open Space

Goal: To protect regionally significant open space and agricultural land from development

Policy 52: The County shall preserve open space areas for the protection of public health and safety, provision of recreational opportunities, production of natural resources (e.g., agriculture, wind power, and mineral extraction), protection of sensitive viewsheds, preservation of biological resources, and the physical separation between neighboring communities.

Environmental Setting

Topography

The Project area is located in the Altamont Hills in the Diablo Range of the Coast Ranges. The Altamont Hills are situated between the eastern edge of Livermore Valley and the western edge of the San Joaquin Valley. Elevations in the Project area range from less than 100 feet above sea level on the far northeastern side of the Project area to about 500 feet above sea level in the south. The topography overall is moderately hilly, with the highest elevations in the west and southwestern portion of the Project area.

Geology

Regional

The Project area is in the east-central portion of California’s Coast Ranges geomorphic province (e.g., Norris and Webb 1990: 359–363; California Geological Survey 2002: 3). The Coast Ranges province is characterized by en echelon (i.e., parallel to subparallel) northwest-trending mountain ranges formed by active uplift related to complex tectonics of the San Andreas fault/plate boundary system (Norris and Webb 1990: 359–380).

The eastern Coast Ranges are broadly antiformal (i.e., fold is convex, with oldest geologic units in the core). At the general latitude of the Project area, they consist of a central core of Mesozoic units—primarily the Cretaceous Panoche Formation—flanked on the east by an upward younging sequence of marine and terrestrial sedimentary units that include the San Pablo Formation, a Miocene fanglomerate, and Quaternary alluvial deposits (Wagner et al. 1991).

Local

The geology of the Project vicinity is shown in Figure 3.7-1. Graymer et al. have divided the geology of Alameda County into nine stratigraphic assemblages, each of which is a fault-bounded block. Assemblage VI and Surficial Deposits occur in the Project area.

Assemblage VI makes up most of the Project area. This assemblage is bounded by the Greenville fault to the west and the Carnegie fault to the south. The northern half of the assemblage is made up of the Great Valley Sequence, which consists primarily of sandstone and interbedded sandstone and shale of Cretaceous age. Underlying most of the Project area is Unit D of the Great Valley Sequence, a medium- to coarse-grained, light gray, clean sandstone. Along the eastern edge of the Unit D sandstone are the Neroly Sandstone, a blue sandstone of late Miocene age with minor conglomerate, and the Oro Loma Formation, a consolidated reddish silt, sand, and gravel. Underlying the road to the west are the Upper and Middle members of the Great Valley sequence Unit C sandstone and shale. The Upper member is a shale and siltstone and the Middle member is a biotite-rich wacke (Graymer et al. 1996: map, 11–13).

Surficial deposits of undivided Quaternary sediments occur in valleys and low-lying areas along the eastern margin of the Project area (Graymer et al. 1996: map, 6).

Seismicity

Primary Seismic Hazards

The State of California considers two aspects of earthquake events as primary seismic hazards: surface fault rupture (i.e., disruption of the Earth's surface as a result of fault activity) and seismic ground shaking.

Surface Fault Rupture

No active faults occur in the Project area, but several are located near the Project area. Alameda County is in a seismically active region and Alquist-Priolo earthquake fault zone maps have been prepared for much of the county (California Geological Survey 2015). One of these maps covers the portion of the Project area that is in an Alquist-Priolo earthquake fault zone, but that fault, the Corral Hollow fault, is south of the Project area. Other active faults near the Project area are the Greenville fault zone, specifically the Marsh Creek-Greenville section, and the Los Positas fault (Figure 3.7-2) (California Geological Survey 2010).

The Midway fault occurs on the southeastern edge of the Project area. Although the USGS Quaternary Fault Database (2017) and California Geological Survey (2010) designate this fault as potentially active (i.e., experienced movement during the last 130,000 years), rather than active (i.e., experienced movement during the last 11,000 years), work conducted by Unruh and Krug (2007:17) for USGS concluded "that the Midway fault is an active structure that primarily accommodates strike-slip displacement."

Although no CGS- or USGS-designated active faults occur in the Project area, the risk of surface fault rupture is unknown because of the presence of the Midway fault in the Project area.

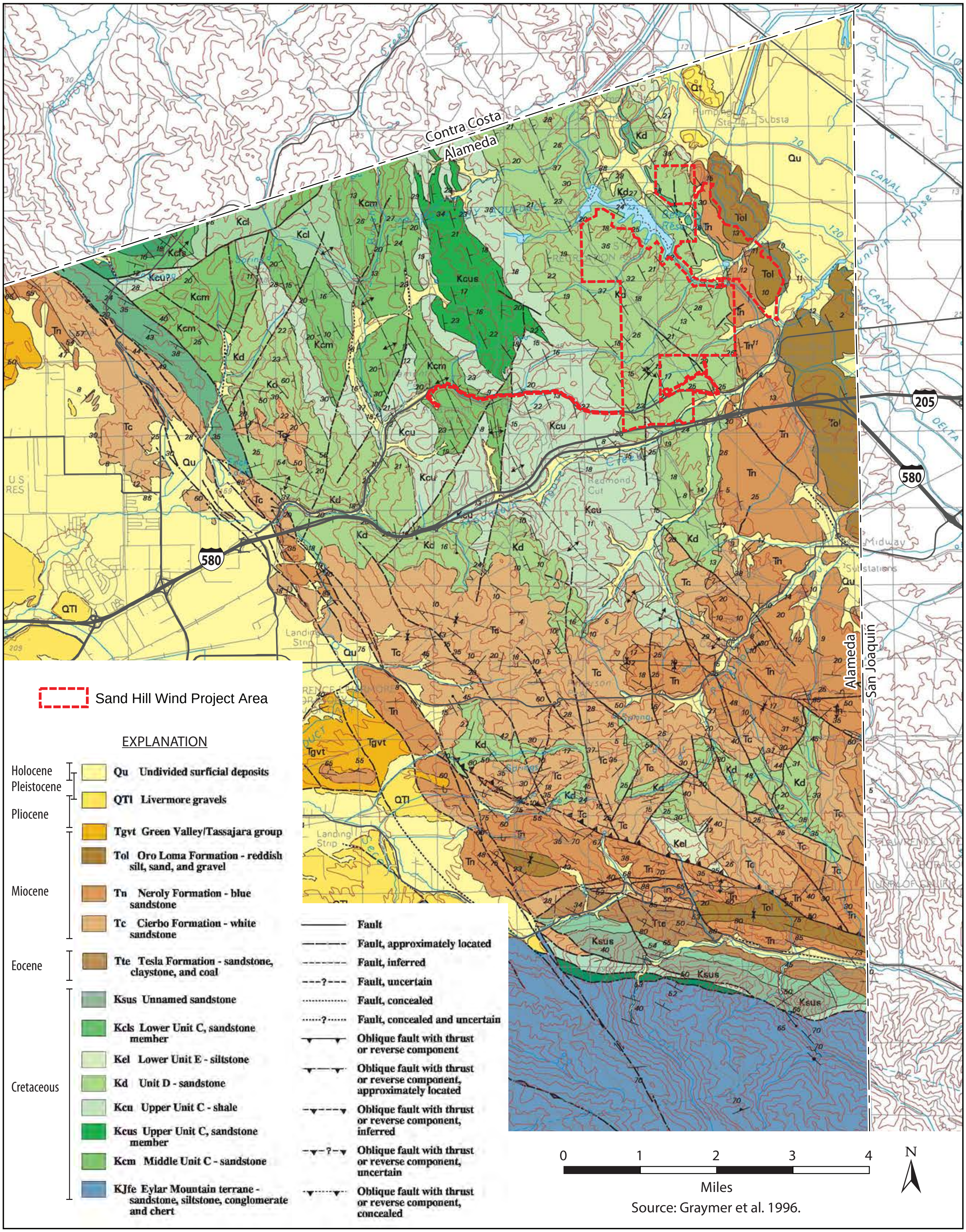

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Figure 3.7-1
Geology Map

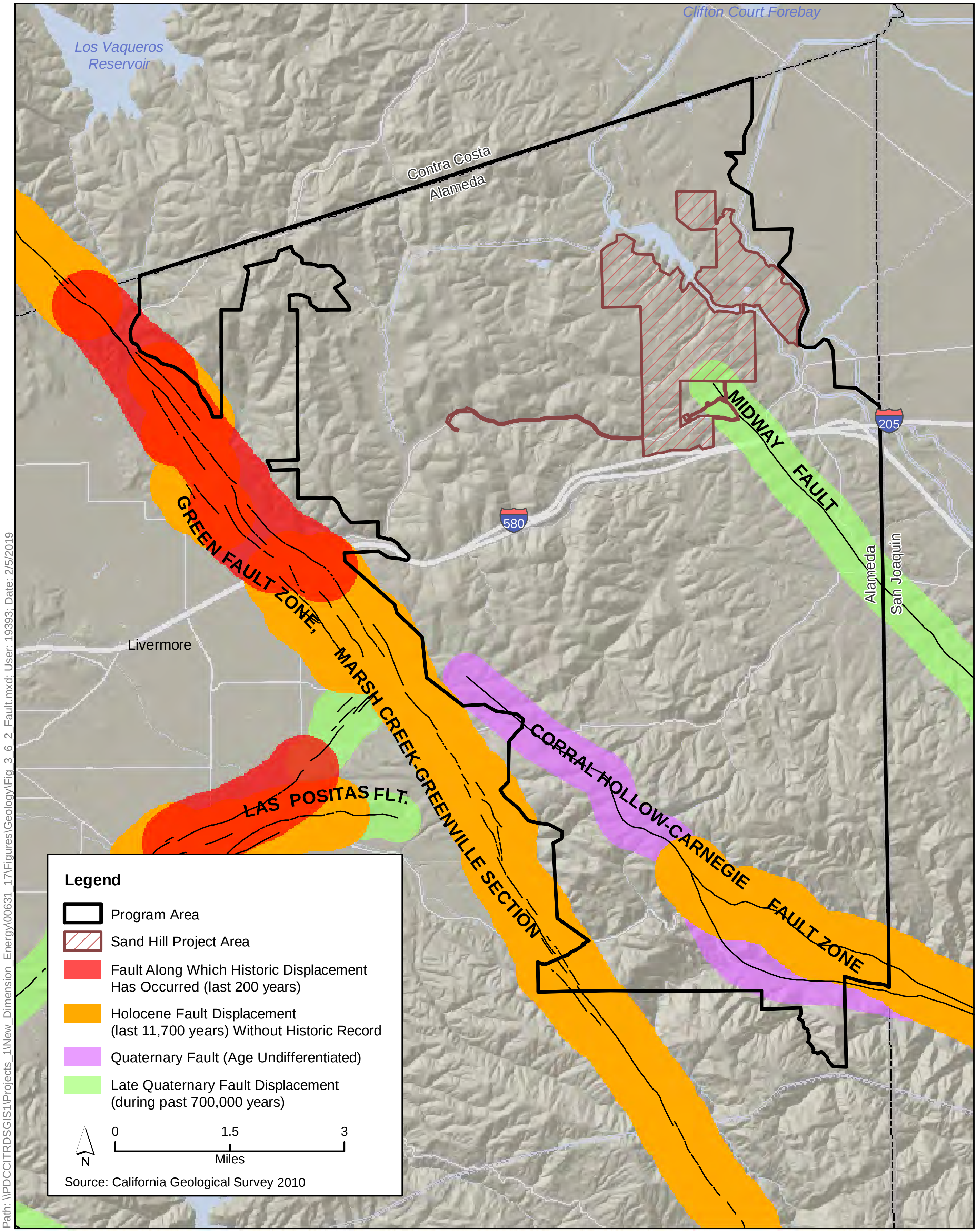

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Figure 3.7-2
Fault Map

Seismic Ground Shaking

Unlike surface rupture, ground shaking is not confined to the trace of a fault, but rather ground shaking propagates into the surrounding areas during an earthquake. The intensity of ground shaking typically diminishes with distance from the fault, but ground shaking may be locally amplified and/or prolonged by some types of substrate materials. These factors are used to map the probabilistic shaking hazards throughout the state.

Based on the probabilistic seismic hazard map, which depicts the peak horizontal ground acceleration values exceeded at a 2% probability in 50 years (California Geological Survey 2008b, 2016), the acceleration value for the Project area indicates a moderate ground-shaking hazard (Figure 3.7-3).

Secondary Seismic Hazards

Secondary seismic hazards are seismically induced landslide, liquefaction, and related types of ground failure events. As discussed in *Regulatory Setting* in Section 3.7.1, *Existing Conditions*, the State of California maps areas that are subject to secondary seismic hazards pursuant to the Seismic Hazards Mapping Act. These hazards are addressed briefly below based on available information.

Landslide and Other Slope Stability Hazards

Just west of the Project area is a designated Zone of Required Investigation for landslide hazard. This zone is in earthquake-induced landslide hazard zones (California Geological Survey 2009a and b) (Figure 3.7-4). The landslide zones tend to be concentrated in areas where the slopes are steeper and/or rock strengths are weaker. Numerous historically active landslides occur along the Greenville fault. Many of the moderate to large rockslides are underlain by the Miocene units of the Neroly Sandstone (Tn), Oro Loma Formation (Tol), and Tesla Formation (Tte), and also the Cierbo Sandstone (Tc) but to a lesser extent. Steep slopes and proximity to faults appear to be the predominant causes of landsliding in the area (California Geological Survey 2009a: v and Section 2, pages 31–32).

Although the Project area is not in an earthquake-induced landslide hazard zone (California Geological Survey 2015), several factors make slope instability (both seismically and nonseismically induced) a concern in this area. These factors include the steep topography, the potential for moderate ground shaking, the presence of the Neroly Sandstone, and the proximity to areas designated as landslide hazard zones. In addition, slope stability related to precipitation is also factor in the Project area (see *Slope Stability [Nonseismic-Related]*, below).

Liquefaction and Related Ground Failure

Liquefaction is the process in which soils and sediments lose shear strength and fail during seismic ground shaking. The vibration caused by an earthquake can increase pore pressure in saturated materials. If the pore pressure is raised to be equivalent to the load pressure, this causes a temporary loss of shear strength, allowing the material to flow as a fluid. This temporary condition can result in severe settlement of foundations and slope failure. The susceptibility of an area to liquefaction is determined largely by the depth to groundwater and the properties (e.g., grain size, density, degree of consolidation) of the soil and sediment within and above the groundwater. The sediments most susceptible to liquefaction are saturated, unconsolidated sand and silt within 40 feet of the ground surface. According to the CGS report prepared for the adjacent Altamont quadrangle, CGS evaluations focus on areas covered by Quaternary (less than about 1.6 million years) sedimentary deposits (California Geological Survey 2009a : Section1, pages 2–4). Improperly compacted artificial fill may also be susceptible to liquefaction.

The liquefaction hazard in most of the Project area is likely low. No liquefaction hazard zones are mapped in the Project area (Figure 3.7-4), and the depth to groundwater in the foothills, which are outside the groundwater basin, is generally greater than 60 feet (California Geological Survey 2009a: Section 1, page 9). In addition, the ages of the rock units in the Project area are generally older than most liquefiable sediments. However, the Quaternary sediments in valleys may be less consolidated and shallow groundwater may be present. Therefore, these areas may be more susceptible to liquefaction.

Other types of ground failure related to liquefaction include lateral spreading and differential settlement. Lateral spreading is a failure of soil/sediment within a nearly horizontal zone that causes the soil to move toward a free face (such as a streambank or canal) or down a gentle slope. Lateral spreading can occur on slopes as gentle as 0.5%. Even a relatively thin layer of liquefiable sediment can create planes of weakness that could cause continuous lateral spreading over large areas (California Geological Survey 2008a: 36).

The potential for lateral spreading in the Project area is unknown.

Differential settlement—the uneven settling of soil—is the most common fill displacement hazard (California Geological Survey 2008a: 49). The potential for differential settlement is unknown because its determination requires site-specific testing.

Slope Stability (Nonseismic-Related)

Nonseismic-related landsliding is common in the Altamont Pass Wind Resource Area.

In 1998, heavy rainfall caused widespread landsliding in the 10-county San Francisco Bay Area region. As a result, USGS geologists conducted a landslide inventory of the affected counties, including Alameda County. Figure 3.7-5 shows the landslides that were mapped in and near the Project area. However, because of the extent of the landsliding, only landslides associated with damage to the built environment were mapped (U.S. Geological Survey 1999: 2 and map). Because the Project area is in a rural area, many landslides are not shown.

In addition, the wide extent of landsliding in and around the Project area is further exemplified by the omission of landslides from the bedrock geologic map of Alameda County “because they are so numerous they would conceal much of the information on bedrock geology” (Graymer et al. 1996:6).

Soils

One soil association underlies most of the Project area and two soil associations occur in small areas on the eastern edge (Figure 3.7-6). Table 3.7-1 summarizes important issues of concern related to suitability for construction. The primary issue of concern is the shrink-swell potential of the soils (i.e., linear extensibility or expansiveness). Many of the soils that make up the Fontana-Diablo-Altamont soil association, which occurs over most of the Project area, have a high shrink-swell potential. Other minor soil associations with a moderate to very high shrink-swell potential are the Carbona-Capay-Calla and Carbona-Calla soil associations. Some soils of the Fontana-Diablo-Altamont soil association are susceptible to water erosion, and the San Ysidro-Rincon soil association is susceptible to wind erosion (Natural Resources Conservation Service 2016).

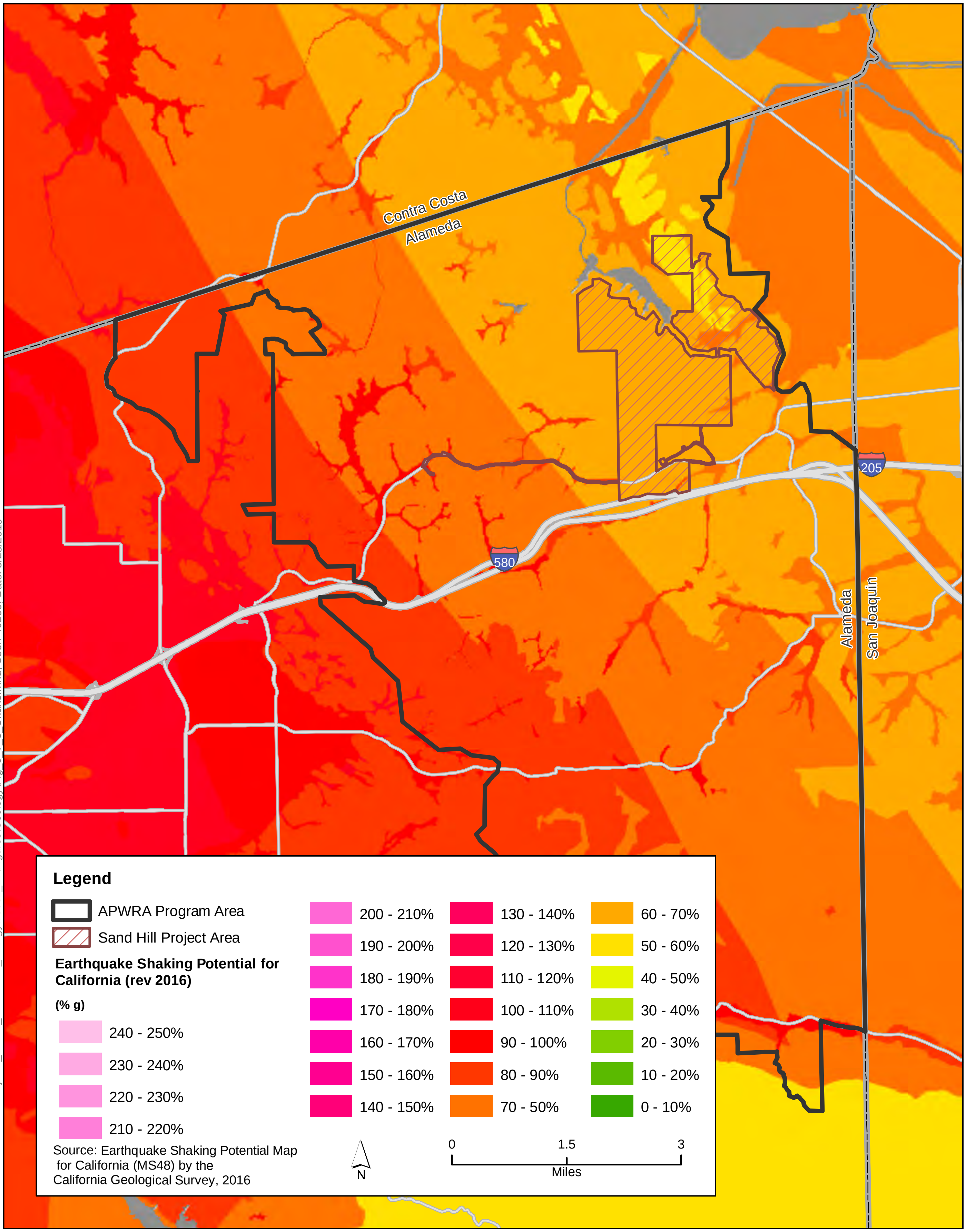

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Figure 3.7-3
Probabilistic Seismic Hazards Map (Seismic Shaking)

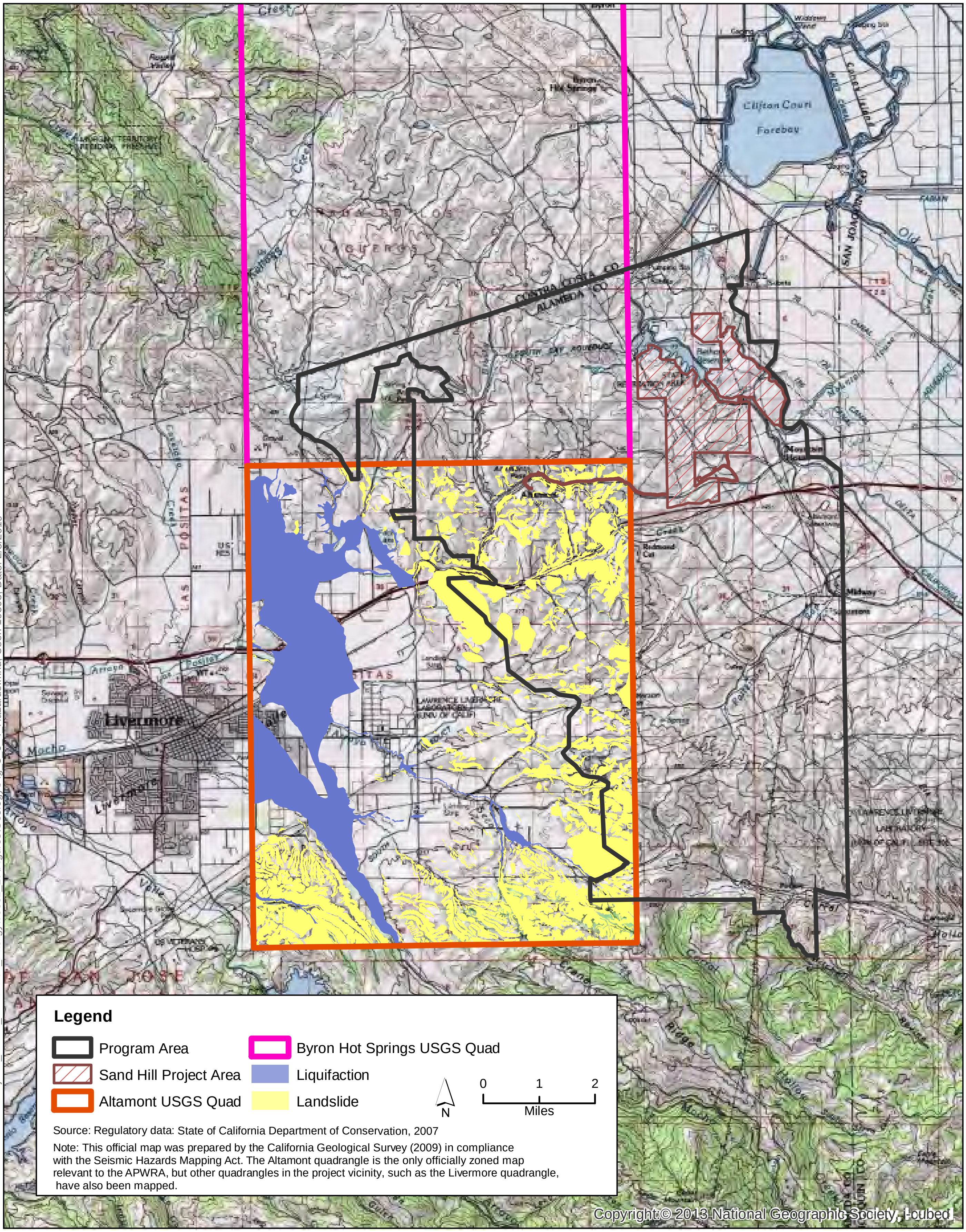

Figure 3.7-4
Seismic Hazard Zone Map
for the Altamont 7.5-Minute Quadrangle

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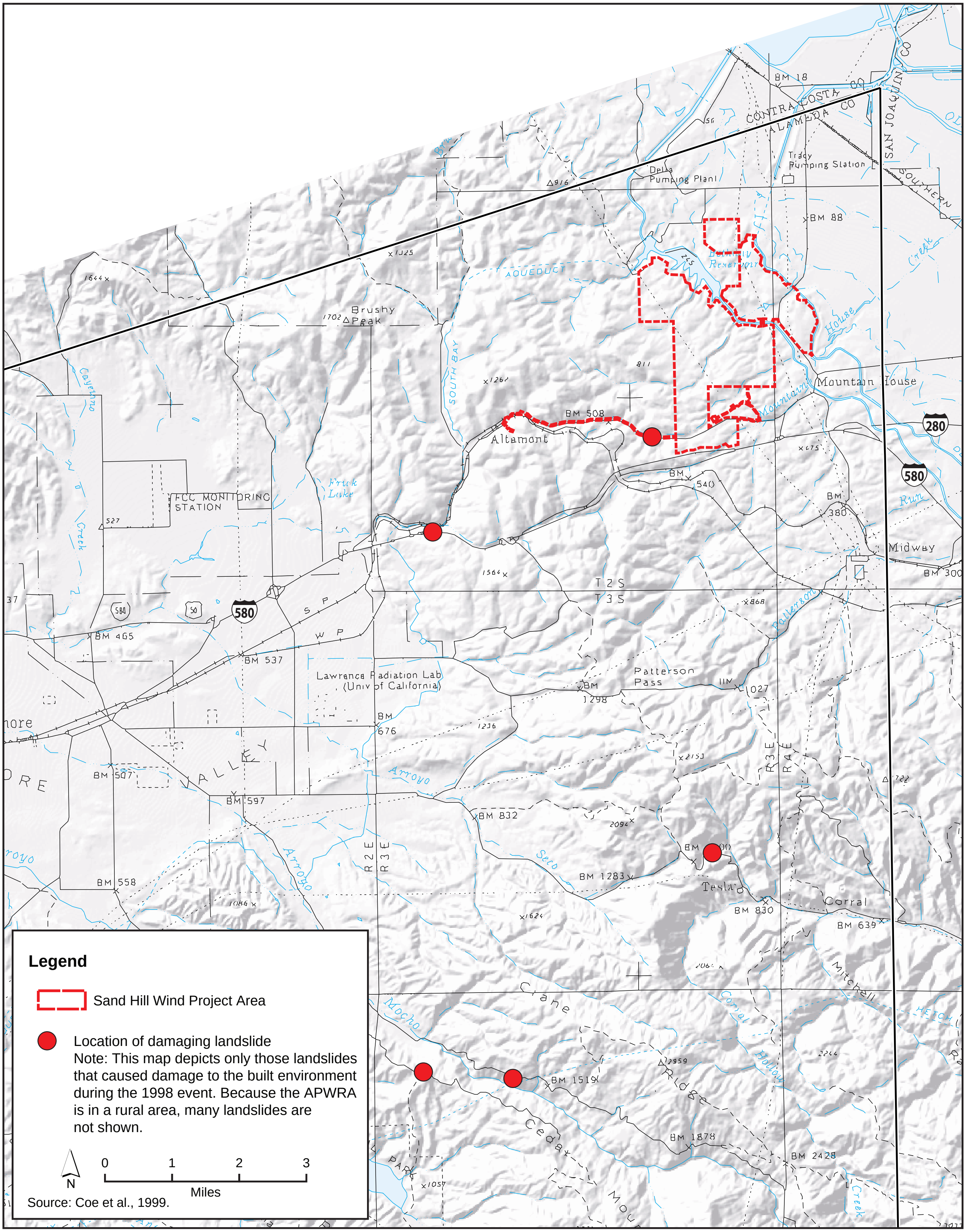

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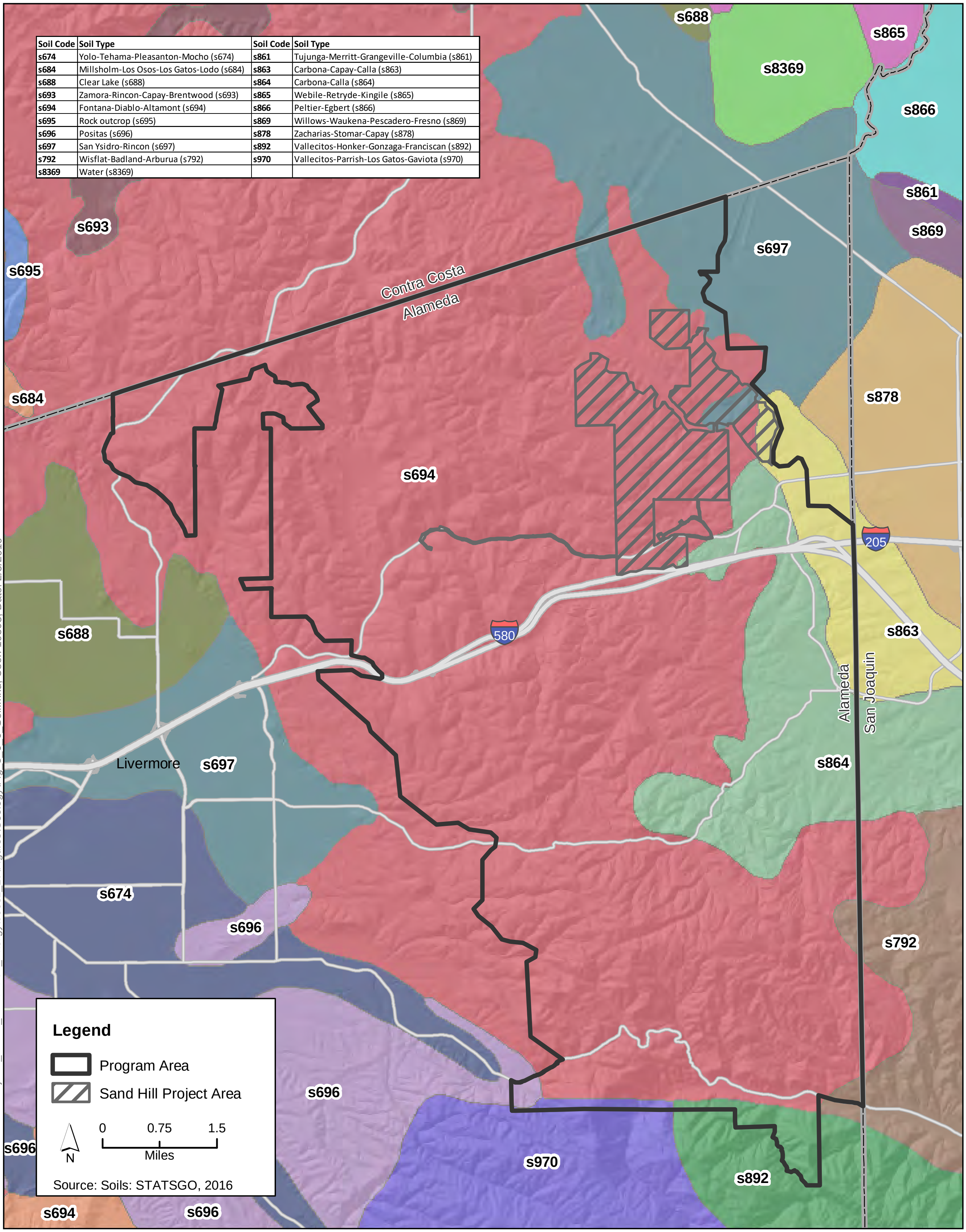
Figure 3.7-5
Landslides Causing Damage to the Built Environment during Heavy Rain Event in 1998



Soil Code	Soil Type	Soil Code	Soil Type
s674	Yolo-Tehama-Pleasanton-Mocho (s674)	s861	Tujunga-Merritt-Grangeville-Columbia (s861)
s684	Millsholm-Los Osos-Los Gatos-Lodo (s684)	s863	Carbona-Capay-Calla (s863)
s688	Clear Lake (s688)	s864	Carbona-Calla (s864)
s693	Zamora-Rincon-Capay-Brentwood (s693)	s865	Webile-Retryde-Kingile (s865)
s694	Fontana-Diablo-Altamont (s694)	s866	Peltier-Egbert (s866)
s695	Rock outcrop (s695)	s869	Willows-Waukena-Pescadero-Fresno (s869)
s696	Positas (s696)	s878	Zacharias-Stomar-Capay (s878)
s697	San Ysidro-Rincon (s697)	s892	Vallecitos-Honker-Gonzaga-Franciscan (s892)
s792	Wisflat-Badland-Arburua (s792)	s970	Vallecitos-Parrish-Los Gatos-Gaviota (s970)
s8369	Water (s8369)		

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Figure 3.7-6
Soil Associations Map

Table 3.7-1. General Characteristics of Soil Associations in the Program Area

Map Symbol	Soil Association	Location and Characteristics
s697	San Ysidro-Rincon	Occurs in northeast central edge of Project area. Some soils in this association are susceptible to wind erosion.
s694	Fontana-Diablo-Altamont	Dominant soil association in Project area. Most soils in this association have a high shrink-swell potential. Some soils in this association have a higher susceptibility to water erosion.
s863	Carbona-Capay-Calla	Occurs in the east-central edge of Project area. All soils in this association have a moderate to high shrink-swell potential.
s864	Carbona-Calla	Occurs in small area of southern edge of Project area. Most soils in this association have a moderate to very high shrink-swell potential.

Source: Natural Resources Conservation Service 2016.

Mineral Resources

There are no known mineral resources in the Project area. According to the California Division of Mines and Geology land classification map prepared for the South San Francisco Bay Production-Consumption (P-C) Region, which includes Alameda County, there no areas designated as MRZ-2 (Kohler-Antablin 1996: Plate 17). No mining is known to occur in the area (California Division of Mine Reclamation 2019). In addition, the general plan does not identify mineral resources in the Project area.

Paleontological Resources

Paleontological sensitivity is a qualitative assessment based on the paleontological potential of the stratigraphic units present, the local geology and geomorphology, and other factors relevant to fossil preservation and potential yield. According to the Society of Vertebrate Paleontology (SVP) (2010), standard guidelines for sensitivity are (1) the potential for a geological unit to yield abundant or significant vertebrate fossils or to yield a few significant fossils, large or small, vertebrate, invertebrate, or paleobotanical remains and (2) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecological, or stratigraphic data (Table 3.7-2).

Table 3.7-2. Paleontological Sensitivity Ratings

Potential	Definition
High	Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a high potential for containing additional significant paleontological resources…Paleontological potential consists of both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, plant, or trace fossils and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data.
Undetermined	Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment are considered to have undetermined potential. Further study is necessary to determine if these rock units have high or low potential to contain significant paleontological resources.

Potential	Definition
Low	Reports in the paleontological literature or field surveys by a qualified professional paleontologist may allow determination that some rock units have low potential for yielding significant fossils. Such rock units will be poorly represented by fossil specimens in institutional collections, or based on general scientific consensus, will only preserve fossils in rare circumstances and the presence of fossils is the exception not the rule.
No	Some rock units, such as high-grade metamorphic rocks (such as gneisses and schists) and plutonic igneous rocks (such as granites and diorites), have no potential to contain significant paleontological resources. Rock units with no potential require neither protection nor impact mitigation measures relative to paleontological resources.

Source: Society of Vertebrate Paleontology 2010.

Most of the geologic units in the Project are highly sensitive for paleontological resources, based primarily on rock type. The Great Valley Sequence contains units with a diverse assemblage of invertebrates, plus marine reptiles and numerous types of plants (Paleo Portal 2013). Great Valley Sequence members in the Project area include Unit D (sandstone), Upper Unit C (shale), and Middle Unit C (sandstone) (Kd, Kcu, and Kcm on Figure 3.7-1).

The Miocene Neroly Formation is also sensitive for paleontological resources because the University of California Museum of Paleontology (UCMP) database contains four records of mammal fossils in this unit (University of California Museum of Paleontology 2019a). The paleontological sensitivity of the Oro Loma Formation is unknown but should be considered high given its depositional environment and age.

The UCMP database contains 1,584 records of vertebrate fossils in Alameda County. However, most of these records are from geologic units not found in the Project area. (University of California Museum of Paleontology 2019b).

3.7.2 Environmental Impacts

This section presents the impact analysis of Project effects related to geology, soils, and paleontological resources. It describes the methods used to determine the impacts of the Project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate significant impacts accompany each discussion of those impacts.

Methods for Analysis

Evaluation of the geology and soil impacts in this section is based on information from published maps, reports, and other documents that describe the geologic, seismic, soil, and mineral resource conditions of the Project area, and on professional judgment. The analysis assumes that the Project proponents will conform to the latest CBSC standards, county general plan seismic safety standards, county grading ordinance, and NPDES requirements.

The primary source of information used in developing the paleontological resources section is the paleontological database at UCMP. Effects on paleontological resources were analyzed qualitatively on a large-scale level, based on professional judgment and the SVP guidelines below.

SVP's *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources* provides standard guidelines that are widely followed (Society of Vertebrate Paleontology 2010). These guidelines reflect the accepted standard of care for paleontological resources. The SVP guidelines identify two key phases in the process for protecting paleontological resources from Project impacts.

- Assess the likelihood that the area contains significant nonrenewable paleontological resources that could be directly or indirectly impacted, damaged, or destroyed as a result of the Project.
- Formulate and implement measures to mitigate potential adverse impacts.

An important strength of SVP's approach to assessing potential impacts on paleontological resources is that the SVP guidelines provide some standardization in evaluating paleontological sensitivity. Table 3.7-3 defines the SVP's sensitivity categories for paleontological resources and summarizes SVP's recommended treatments to avoid adverse effects in each sensitivity category.

No new field work, research, or engineering level design was conducted for the preparation of this EIR.

Table 3.7-3. Society of Vertebrate Paleontology's Recommended Treatment for Paleontological Resources

Sensitivity Category	Mitigation Treatment
High or Undetermined	• An intensive field survey and surface salvage prior to earthmoving, if applicable. • Monitoring by a qualified paleontological resource monitor of excavations. • Salvage of unearthed fossil remains and/or traces (e.g., tracks, trails, burrows). • Screen washing to recover small specimens, if applicable. • Preliminary survey and surface salvage before construction begins. • Preparation of salvaged fossils to a point of being ready for curation (i.e., removal of enclosing matrix, stabilization and repair of specimens, and construction of reinforced support cradles where appropriate). • Identification, cataloging, curation, and provision for repository storage of prepared fossil specimens. • A final report of the finds and their significance.
Low or no	Rock units with low or no potential typically will not require impact mitigation measures to protect fossils.

Source: Society of Vertebrate Paleontology 2010.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the proposed Project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving any of the following.
  - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other

substantial evidence of a known fault. (Refer to Division of Mines and Geology Special Publication 42).

    - Strong seismic ground shaking.
    - Seismic-related ground failure, including liquefaction.
    - Landslides.

- Result in substantial soil erosion or the loss of topsoil.
- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse.
- Be located on expansive soil, creating substantial direct or indirect risks to life or property.
- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater.
- Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state.
- Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

The Project would not include groundwater or natural gas pumping and therefore would not cause subsidence (i.e., the lowering of the land surface as a result of groundwater or natural gas withdrawal). Therefore, this topic was dismissed from further discussion and there is no need to address impacts related to this CEQA checklist criterion.

The Project would also not include installation of septic systems or alternative wastewater disposal. Therefore this topic was dismissed from further discussion during the scoping period and there is no need to address impacts related to this CEQA checklist criterion.

In addition, the Project would not affect mineral resources because there are no known mineral resources in the Project area and no mining is known to occur in the area. Therefore, there is no need to address impacts related to this CEQA checklist criterion.

Impacts and Mitigation Measures

Project Impacts

Impact GEO-1: Potential substantial adverse effects involving rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, including liquefaction, or landslides (less than significant with mitigation)

A small portion of the Midway fault occurs on the southeastern edge of the Project area. The Midway fault is designated as a potentially active fault (i.e., active during the last 130,000 years). If a turbine were constructed on or near a fault, rupture of that fault could damage a turbine or cause harm to personnel on the site. The turbine could be damaged or collapse and possibly injure personnel or property in the immediate area. However, because the Project area is more removed from identified faults than much of the Project area and no structures would be built in the vicinity of the Midway fault, no impacts beyond those identified in the PEIR would result. Implementation of PEIR Mitigation Measure GEO-1, *Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report*, would reduce this impact to a less-than-significant level. This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact. Implementation of PEIR Mitigation Measure GEO-1 would reduce this impact to a less-than-significant level.

As disclosed in the PEIR, construction of turbines or power collection systems in areas with the potential to experience strong ground shaking could expose people or structures to potential substantial adverse effects. Strong ground shaking could also result in earthquake-induced ground failure liquefaction, landsliding, lateral spread, or differential settlement. The turbine could be damaged or collapse and possibly injure personnel or damage property in the immediate area. Implementation of PEIR Mitigation Measure GEO-1 would reduce this impact to a less-than-significant level. The site-specific geotechnical report would assess the potential for geologically related impacts and recommend locations for siting project features (e.g., turbines). This conclusion is consistent with the analysis presented in the PEIR, and the mitigation measures set forth in the PEIR would adequately address this impact.

In addition to seismic-related ground failure discussed in preceding impacts, construction of turbines or power collection systems in areas with potential to experience non-seismic-related landsliding caused by heavy precipitation could also expose people or structures to potential substantial adverse effects. Damage or collapse resulting from landsliding could cause harm to personnel or property in the immediate area, as disclosed in the PEIR.

Although the Project must comply with existing building safety requirements, these requirements may not address all ground failure issues. Implementation of PEIR Mitigation Measure GEO-1 would reduce this impact to a less-than-significant level.

PEIR Mitigation Measure GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report

Prior to construction activities at any site, the Project proponent will retain a geotechnical firm with local expertise in geotechnical investigation and design to prepare a site-specific geotechnical report. This report will be prepared by a licensed geotechnical engineer or engineering geologist and will be submitted to the County building department as part of the approval process. This report will be based on data collected from subsurface exploration, laboratory testing of samples, and surface mapping and will address the following issues.

- Potential for surface fault rupture and turbine site location: The geotechnical report will investigate the Greenville, Corral Hollow-Carnegie, and the Midway faults (as appropriate to the location) and determine whether they pose a risk of surface rupture. Turbine foundations and power collection systems will be sited according to recommendations in this report.
- Strong ground shaking: The geotechnical report will analyze the potential for strong ground shaking in Project area and provide turbine foundation design recommendations, as well as recommendations for power collection systems.
- Slope failure: The geotechnical report will investigate the potential for slope failure (both seismically and nonseismically induced) and develop site-specific turbine foundation and

power collection system plans engineered for the terrain, rock and soil types, and other conditions present at the Project area in order to provide long-term stability.

- Expansive soils: The geotechnical report will assess the soil types in the Project area and determine the best engineering designs to accommodate the soil conditions.
- Unstable cut or fill slopes: The geotechnical report will address geologic hazards related to the potential for grading to create unstable cut or fill slopes and make site-specific recommendations related to design and engineering.

Impact GEO-2: Potential to result in substantial soil erosion or the loss of topsoil (less than significant)

As disclosed in the PEIR, decommissioning and Project construction could cause surface disturbance and vegetation removal resulting in soil erosion. However, compliance with federal and local erosion-related regulations (e.g., the SWPPP developed for the Project, requirements of the county's Stormwater Management Plan) would ensure that ground-disturbing activities do not result in significant erosion. Typical erosion-prevention measures such as silt fences, staked straw bales/wattles, silt/sediment basins and traps, check dams, geofabric, sandbag dikes, and temporary revegetation or other ground cover would be used. Moreover, the PEIR requires a reclamation plan with specific measures taken to ensure that repowering sites are regraded and seeded to pre-Project conditions. These requirements would ensure that potential impacts of soil erosion would be less than significant, and no mitigation is required.

Impact GEO-3: Placement of Project-related facilities on a geologic unit or soil that is unstable or that would become unstable as a result of the Project and potentially result in an onsite or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse (less than significant with mitigation)

In addition to seismic-related ground failure discussed in Impact Geo-1 (e.g., lateral spreading and liquefaction), construction of turbines or power collection systems in areas with potential to experience non-seismic-related landsliding caused by heavy precipitation could also expose people or structures to potential substantial adverse effects. Damage or collapse resulting from landsliding could cause harm to personnel or property in the immediate area, as disclosed in the PEIR.

Although the Project must comply with existing building safety requirements, these requirements may not address all ground failure issues. Implementation of PEIR Mitigation Measure GEO-1 would reduce this impact to a less-than-significant level by requiring a site-specific geotechnical report and implementation of its recommendations. This report would assess the potential for geologically related impacts and recommend locations for siting project features (e.g., turbines).

PEIR Mitigation Measure GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report

Impact GEO-4: Placement of Project-related facilities on expansive soil, creating substantial direct or indirect risks to life or property (less than significant with mitigation)

The PEIR disclosed that expansive soils occur in much of the program area, particularly in the Fontana-Diablo-Altamont soil association, which is the dominant soil association in the Project area. Turbine foundations built on expansive soils would be subject to the shrink and swell of these soils, which could damage structures if the subsoil, drainage, and foundation are not properly engineered.

However, soil sampling and treatment procedures are addressed by state and local building codes. Treatment of expansive soil may include removing the expansive soil and replacing it with non-expansive soil, incorporating additives, and installing specially designed foundations. Compliance with these codes and implementation of PEIR Mitigation Measure GEO-1 would reduce this impact to a less-than-significant level by removing or treating the expansive soil or designing foundations to counteract the expansion.

PEIR Mitigation Measure GEO-1: Conduct site-specific geotechnical investigation and implement design recommendations in subsequent geotechnical report

Impact GEO-5: Direct or indirect destruction of a unique paleontological resource or site or unique geologic feature (less than significant with mitigation)

If fossils are present in the Project area, they could be damaged by during earth-disturbing activities during construction, such as excavation for foundations, placement of fills, trenching for power collection systems, and grading for roads and staging areas. The more extensive and deeper the earth-disturbing activity, the greater the potential for damage to paleontological resources.

The Neroly Formation and some units of the Great Valley Sequence are known to contain vertebrate fossils. Substantial damage to or destruction of significant paleontological resources as defined by the Society of Vertebrate Paleontology (2010) would be a significant impact.

Because most geologic units in the Project area are likely to be sensitive for paleontological resources, excavation in these units could damage paleontological resources.

This impact would be significant, but implementation of PEIR Mitigation Measures GEO-7a, *Retain a qualified professional paleontologist to monitor significant ground-disturbing activities*; GEO-7b, *Educate construction personnel in recognizing fossil material*; and GEO-7c, *Stop work if substantial fossil remains are encountered during construction*, would reduce this impact to a less-than-significant level by having qualified paleontologist onsite to monitor, protect, and recover fossils and training construction personnel to recognize fossils and take appropriate steps to protect them if a paleontologist is not present.

PEIR Mitigation Measure GEO-7a: Retain a qualified professional paleontologist to monitor significant ground-disturbing activities

The applicant will retain a qualified professional paleontologist as defined by the SVP's *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources* (2010) to monitor activities with the potential to disturb sensitive paleontological resources. Data gathered during detailed Project design will be used to determine the activities that will require the presence of a monitor. In general, these activities include any ground-disturbing activities involving excavation deeper than 3 feet in areas with high potential to contain sensitive paleontological resources. Recovered fossils will be prepared so that they can be properly documented. Recovered fossils will then be curated at a facility that will properly house and label them, maintain the association between the fossils and field data about the fossils' provenance, and make the information available to the scientific community.

PEIR Mitigation Measure GEO-7b: Educate construction personnel in recognizing fossil material

The applicant will ensure that all construction personnel receive training provided by a qualified professional paleontologist experienced in teaching non-specialists to ensure that they can recognize fossil materials in the event any are discovered during construction.

PEIR Mitigation Measure GEO-7c: Stop work if substantial fossil remains are encountered during construction

If substantial fossil remains (particularly vertebrate remains) are discovered during earth disturbing activities, activities within 100 feet of the find will stop immediately until a state-registered professional geologist or qualified professional paleontologist can assess the nature and importance of the find and a qualified professional paleontologist can recommend appropriate treatment. Treatment may include preparation and recovery of fossil materials so that they can be housed in an appropriate museum or university collection and may also include preparation of a report for publication describing the finds. The applicant will be responsible for ensuring that recommendations regarding treatment and reporting are implemented.

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3.8 Greenhouse Gas Emissions

This section also provides an overview of the regulatory framework applicable to greenhouse gas (GHG) emissions at the statewide, regional, and local scales and evaluates the potential environmental impacts associated with implementation of the proposed Project. GHG emissions refer to airborne pollutants that affect global climate conditions. These gaseous pollutants have the effect of trapping heat in the atmosphere, and consequently altering weather patterns and climactic conditions over long timescales. Consequently, unlike other resource areas that are primarily concerned with localized project impacts (e.g., within 1,000 feet of the project site), the global nature of climate change requires a broader analytic approach. Accordingly, while the GHG analysis focuses on emissions generated at the restoration sites, the climate change study area includes the global context.

3.8.1 Existing Conditions

Regulatory Setting

Federal Regulations

There is currently no federal overarching law specifically related to climate change or the reduction of GHG emissions. During the Obama Administration, the U.S. Environmental Protection Agency (EPA) had been developing regulations under the Clean Air Act pursuant to EPA's authority under the act.[1]. There have also been settlement agreements between EPA, several states, and nongovernmental organizations to address GHG emissions from electric generating units and refineries, as well as the EPA's issuance of an "Endangerment Finding" and a "Cause or Contribute Finding." EPA has also adopted a Mandatory Reporting Rule and Clean Power Plan. Under the Clean Power Plan, EPA issued regulations to control carbon dioxide (CO_2) emissions from new and existing coal-fired power plants. However, on February 9, 2016 the Supreme Court issued a stay of these regulations pending litigation. Former EPA Administrator Scott Pruitt also signed a measure to repeal the Clean Power Plan. The fate of the proposed regulations is uncertain given the change in federal administrations and the pending deliberations in federal courts.

State Regulations

California has adopted statewide legislation addressing various aspects of climate change and GHG emissions mitigation. Much of this legislation establishes a broad framework for the state's long-term GHG reduction and climate change adaptation program. The governor has also issued several executive orders (EOs) related to the state's evolving climate change policy. Of particular importance are Assembly Bill (AB) 32 and Senate Bill (SB) 32, which outline the state's GHG reduction goals of achieving 1990 emissions levels by 2020 and a 40% reduction below 1990 emissions levels by 2030.

In the absence of federal regulations, control of GHGs is generally regulated at the state level and is typically approached by setting emission reduction targets for existing sources of GHGs, setting

[1] In *Coalition for Responsible Regulation, Inc., et al. v. EPA*, the United States Court of Appeals upheld EPA's authority to regulate GHG emissions under the Clean Air Act.

policies to promote renewable energy and increase energy efficiency, and developing statewide action plans. Summaries of key policies, legal cases, regulations, and legislation at the state levels that are relevant to the Project are identified below.

Executive Order S-3-05 (2005)

Executive Order (EO) S-3-05 asserted that California is vulnerable to the effects of climate change. To combat this concern, the order established the following GHG emissions reduction targets.

- 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.

Executive orders are legally binding only on state agencies. Accordingly, EO S-3-05 guides state agencies' efforts to control and regulate GHG emissions but has no direct, binding effect on local government or private actions. The secretary of the California Environmental Protection Agency is required to report to the governor and state legislature biannually regarding the impacts of global warming on California, mitigation and adaptation plans, and progress made toward reducing GHG emissions to meet the targets established in this EO.

Assembly Bill 32 – California Global Warming Solutions Act (2006)

AB 32 codified the state's GHG emissions target by requiring that the state's global warming emissions be reduced to 1990 levels by 2020. Since AB 32 was adopted, the California Air Resources Board (CARB), the California Energy Commission (CEC), the California Public Utilities commission (CPUC), and the Building Standards Commission have been developing regulations that will help meet the goals of AB 32. The AB 32 Scoping Plan identifies specific measures to reduce GHG emissions to 1990 levels by 2020, and requires CARB and other state agencies to develop and enforce regulations and other initiatives for reducing GHGs. Specifically, the AB 32 Scoping Plan articulates a key role for local governments, recommending they establish GHG reduction goals for both their municipal operations and the community consistent with those of the state.

Assembly Bill 1493—Pavley Rules (2002, Amendments 2009, 2012 rulemaking)

Known as *Pavley I*, AB 1493 standards were the nation's first GHG standards for automobiles. AB 1493 requires CARB to adopt vehicle standards that will lower GHG emissions from new light-duty autos to the maximum extent feasible beginning in 2009. Additional strengthening of the Pavley standards (referred to previously as *Pavley II*, now referred to as the *Advanced Clean Cars* measure) has been proposed for vehicle model years 2017–2025. Together, the two standards are expected to increase average fuel economy to roughly 54.5 miles per gallon by 2025.

Executive Order S-01-07- Low Carbon Fuel Standard (2007)

EO S-01-07 essentially mandates: (1) that a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10% by 2020; and (2) that a Low Carbon Fuel Standard (LCFS) for transportation fuels be established in California. CARB approved the LCFS on April 23, 2009, and the regulation became effective on January 12, 2010. The U.S. District Court for the Eastern District of California ruled in December 2011 that the LCFS violates the Commerce Clause of the U.S. Constitution. CARB appealed this ruling in 2012 and on September 18, 2013, the

Ninth U.S. Circuit Court of Appeals upheld the LCFS, ruling that the program does not violate the Commerce Clause and remanding the case to the Eastern District.

Senate Bills 1078, 107, and 2—Renewables Portfolio Standard (2011)

SBs 1078 (2002), 107 (2006) and 2 (2011), California's Renewables Portfolio Standard (RPS), obligates investor-owned utilities, energy service providers, and community choice aggregators to procure additional retail sales per year from eligible renewable sources with the target of procuring 33% of retail sales from renewable resources by 2020. The CPUC and CEC are jointly responsible for implementing the program.

Senate Bill 32 (2016)

SB 32 (2016) requires CARB to ensure that statewide GHG emissions are reduced to at least 40% below the 1990 level by 2030, consistent with the target set forth in EO B-30-15. CARB adopted the *2017 Climate Change Scoping Plan* in November 2017 to meet the GHG reduction requirement set forth in SB 32. It proposes continuing the major programs of the previous Scoping Plan, including cap-and-trade regulation, LFCS, more efficient cars, trucks, and freight movement, RPS, and reducing methane emissions from agricultural and other wastes. The 2017 Scoping Plan also addresses for the first time the GHG emissions from natural and working lands in California (California Air Resources Board 2017).

Assembly Bill 197 (2016)

The companion bill to SB 32, AB 197, creates requirements to form a Joint Legislative Committee on Climate Change Policies, requires CARB to prioritize direct emission reductions and consider social costs when adopting regulations to reduce GHG emissions beyond the 2020 statewide limit, requires ARB to prepare reports on sources of GHGs and other pollutants, establishes 6-year terms for voting members of ARB, and adds two legislators as non-voting members of CARB.

Senate Bill 100—The 100 Percent Clean Energy Act of 2018 (2018)

SB 100 builds on SB 350, the Clean Energy and Pollution Reduction Act of 2015, which required the following by 2030: (1) an RPS of 50% and (2) a doubling of energy efficiency (electrical and natural gas) by 2030, including improvements to the efficiency of existing buildings. SB 100 increases the 2030 RPS target set in SB 350 to 60% and requires an RPS of 100% by 2045.

Executive Order B-55-18 (2018)

EO B-55-18 establishes a statewide goal to achieve carbon neutrality by 2045 and to achieve and maintain net negative emissions thereafter. This goal is in addition to the statewide targets for reducing GHGs set in EO S-3-05 and SB 32.

Regional and Local Regulations

Bay Area Air Quality Air Quality Management District

The Bay Area Air Quality Air Quality Management District (BAAQMD) is the regional agency with jurisdiction over air quality in the Project area. In May 2017, the BAAQMD adopted an update to its *CEQA Air Quality Guidelines* (Bay Area Air Quality Management District 2017), which includes operational significance thresholds for GHG emissions (which were previously included in the

2010/2011 and 2012 guidelines). BAAQMD recommends that the following measures be incorporated into all projects.

- Use alternative-fueled (e.g., biodiesel, electric) construction vehicles/equipment for at least 15% of the fleet.
- Use at least 10% local building materials.
- Recycle or reuse at least 50% of construction waste or demolition materials.

San Joaquin Air Pollution Control District

The San Joaquin Valley Air Pollution Control District (SJVAPCD) has published *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA* to assist lead agencies in determining the level of significance of operation-related GHG emissions pursuant to CEQA (San Joaquin Valley Air Pollution Control District 2009). This guidance has since been incorporated into SJVAPCD's 2015 *Guidance for Assessing and Mitigating Air Quality Impacts*.

SVJAPCD's GHG guidance is intended to streamline CEQA review by pre-quantifying emissions reductions that would be achieved through the implementation of best performance standards (BPS). Projects are considered to have a less-than-significant cumulative impact on climate change if any of the following conditions are met.

- Comply with an approved GHG reduction plan.
- Achieve a score of at least 29 using any combination of approved operational BPS[2].
- Reduce operational GHG emissions by at least 29% over business-as-usual conditions (demonstrated quantitatively).

SJVAPCD guidance recommends quantification of GHG emissions for all projects in which an EIR is required, regardless of whether BPS implementation would achieve a score of 29. Although the thresholds adopted by SJVAPCD were developed for internal use for projects in which the SJVAPCD is the lead agency, the thresholds provide guidance to other agencies establishing their own processes for determining significance related to climate change (San Joaquin Valley Air Pollution Control District 2009).

Alameda County

In June 2011, the Alameda County Board of Supervisors approved a *Community Climate Action Plan* (CCAP) for the unincorporated areas of Alameda County. The goal of the CCAP is to reduce Countywide GHG emissions by 15% by 2020. The CCAP includes measures to reduce GHG emissions from the following activities.

- Transportation (e.g., bicycle infrastructure and transit service).
- Planning (e.g., encouraging high-density development and mixed-use development).
- Water conservation (e.g., water-efficient appliances and rainwater use).
- Waste diversion (e.g., improve services for recycling and composting)
- Building energy use (e.g., energy retrofits).

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[2] A score of 29 represents a 29% reduction in GHG emissions relative to unmitigated conditions (1 point = 1%). This goal is consistent with the reduction targets established by AB 32.

- Green infrastructure (e.g., urban forest expansion).

An environmental review was completed under CEQA for the CCAP to identify any significant impacts on the environment, and, how those impacts may be mitigated. The Negative Declaration and Initial Study prepared by County planning staff indicates that the General Plan Amendment and adoption of the CCAP would have no significant environmental impacts in any category of environmental issue reviewed. The CCAP, General Plan Amendment, and Negative Declaration were adopted by the Board of Supervisors on February 4, 2014, and the CCAP is now in effect and part of the *Alameda County General Plan* (Alameda County 2014).

City of Tracy

The City of Tracy's *Sustainability Action Plan* provides Tracy with a guide to reduce GHG emissions, reduce consumption of nonrenewable resources, and improve public health. The goal of this plan is to reduce citywide GHG emissions by 15% per capita from the 2006 baseline, which includes targets for renewable energy. Applicable targets are described below (City of Tracy 2011).

- 25% of all community energy needs provided by renewable sources.
- 25% of all municipal energy needs provided by renewable sources.

City of Stockton

The City of Stockton's *Climate Action Plan* provides Stockton with numerous measures for both existing and new development. The goal of this plan is to reduce citywide GHG emissions by 20% per capita from 2005 to 2020. The largest GHG reductions are identified in the areas of building energy (both energy efficiency and renewable energy), transportation, and waste (City of Stockton 2014).

Environmental Setting

Greenhouse Effect and Climate Change

The phenomenon known as the *greenhouse effect* keeps the atmosphere near Earth's surface warm enough for the successful habitation of humans and other life forms. The greenhouse effect is created by sunlight that passes through the atmosphere. Some of the sunlight striking Earth is absorbed and converted to heat, which warms the surface. The surface emits a portion of this heat as infrared radiation, some of which is re-emitted toward the surface by GHGs. Human activities that generate GHGs increase the amount of infrared radiation absorbed by the atmosphere, thus enhancing the greenhouse effect and amplifying the warming of Earth.

Increases in fossil fuel combustion and deforestation have exponentially increased concentrations of GHGs in the atmosphere since the Industrial Revolution. Rising atmospheric concentrations of GHGs in excess of natural levels result in increasing global surface temperatures—a phenomenon commonly referred to as *global warming*. Higher global surface temperatures, in turn, result in changes to Earth's climate system, including increased ocean temperature and acidity, reduced sea ice, variable precipitation, and increased frequency and intensity of extreme weather events (Intergovernmental Panel on Climate Change 2007). Large-scale changes to Earth's system are collectively referred to as *climate change.*

The Intergovernmental Panel on Climate Change (IPCC) was established by the World Meteorological Organization and United Nations Environment Programme to assess scientific, technical, and socioeconomic information relevant to the understanding of climate change, its potential impacts, and options for adaptation and mitigation. The IPCC estimates that the average global temperature will rise by 0.3–4.8°C (0.5–8.6°F) during the twenty-first century (Intergovernmental Panel on Climate Change 2013). Large increases in global temperatures could have substantial adverse effects on the natural and human environments worldwide and in California.

Pollutants of Concern

The principle anthropogenic (human-made) GHGs contributing to global warming are CO_2, methane (CH_4), nitrous oxide (N_2O), and fluorinated compounds, including sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs). Water vapor, the most abundant GHG, is not included in this list because its natural concentrations and fluctuations far outweigh its anthropogenic sources.

The primary GHGs of concern associated with the Project are CO_2, CH_4, N_2O, and SF_6. Principal characteristics of these pollutants are discussed below.

Carbon dioxide enters the atmosphere through fossil fuels (oil, natural gas, and coal) combustion, solid waste decomposition, plant and animal respiration, and chemical reactions (e.g., manufacture of cement). CO_2 is also removed from the atmosphere (or *sequestered*) when it is absorbed by plants as part of the biological carbon cycle.

Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and from the decay of organic waste in municipal solid waste landfills.

Nitrous oxide is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.

Sulfur Hexafluoride is a human-made chemical used as an electrical insulating fluid for power distribution equipment, in the magnesium industry, in semiconductor manufacturing, and also as a tracer chemical for the study of oceanic and atmospheric processes.

Methods have been set forth to describe emissions of GHGs in terms of a single gas to simplify reporting and analysis. The most commonly accepted method to compare GHG emissions is the global warming potential methodology defined in IPCC reference documents. IPCC defines the global warming potential of various GHG emissions on a normalized scale that recasts all GHG emissions in terms of carbon dioxide equivalent (CO_2e), which compares the gas in question with that of the same mass of CO_2 (CO_2 has a global warming potential of 1 by definition).

Table 3.8-1 lists the global warming potential of CO_2, CH_4, N_2O, and SF_6, their lifetimes, and abundances in the atmosphere.

Table 3.8-1. Lifetimes and Global Warming Potentials of Key Greenhouse Gases

Greenhouse Gases	Global Warming Potential (100 years)	Lifetime (years)	Current Atmospheric Abundance
CO_2	1	50–200	400 ppm
CH_4	25	9–15	1,834 ppb
N_2O	298	121	328 ppb
SF_6	23,900	3,200	8.6 ppt

Sources: California Air Resources Board 2018a; Blasing 2016.

CH_4 = methane; CO_2 = carbon dioxide; N_2O = nitrous oxide; ppb = parts per billion; ppm = parts per million; ppt = parts per trillion.

Greenhouse Gas Inventories

A GHG inventory is a quantification of all GHG emissions and sinks[3] within a selected physical and/or economic boundary. GHG inventories can be performed on a large scale (e.g., for global and national entities) or on a small scale (e.g., for a particular building or person). Although many processes are difficult to evaluate, several agencies have developed tools to quantify emissions from certain sources. Table 3.8-2 outlines the most recent global, national, statewide, and local GHG inventories to help contextualize the magnitude of potential Project-related emissions.

Table 3.8-2. Global, National, State, and Local Greenhouse Gas Emissions (metric tons per year)

Emissions Inventory	CO_2e (rounded)
2010 IPCC Global	52,000,000,000
2016 EPA National	6,511,000,000
2016 CARB State	429,400,000
2005 Alameda County	930,000
2005 City of Stockton	2,360,932
2006 City of Tracy	11,449

Sources: Intergovernmental Panel on Climate Change 2014; U.S. Environmental Protection Agency 2018; California Air Resources Board 2018b; Alameda County 2014. City of Tracy 2011, City of Stockton 2014.

CARB = California Air Resources Board; CO_2e = carbon dioxide equivalent; EPA = U.S. Environmental Protection Agency; GHG = greenhouse gas; IPCC = Intergovernmental Panel on Climate Change.

Potential Climate Change Effects

Climate change is a complex phenomenon that has the potential to alter local climatic patterns and meteorology. Although modeling indicates that climate change will result in sea level rise (both globally and regionally) as well as changes in climate and rainfall, among other effects, there remains uncertainty about characterizing precise *local* climate characteristics and predicting precisely how various ecological and social systems will react to any changes in the existing climate at the local level. Regardless of this uncertainty, it is widely understood that substantial climate change is expected to occur in the future, although the precise extent will take further research to

[3] A *GHG sink* is a process, activity, or mechanism that removes a GHG from the atmosphere.

define. Significant impacts from global climate change worldwide and in California include the following:

- Declining sea ice and mountain snowpack levels, thereby increasing sea levels and sea surface evaporation rates with a corresponding increase in atmospheric water vapor, due to the atmosphere's ability to hold more water vapor at higher temperatures (California Natural Resources Agency 2018).
- Rising average global sea levels primarily due to thermal expansion and the melting of glaciers, ice caps, and the Greenland and Antarctic ice sheets (Intergovernmental Panel on Climate Change 2018).
- Changing weather patterns, including changes to precipitation, ocean salinity, and wind patterns, and more energetic aspects of extreme weather including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones (Intergovernmental Panel on Climate Change 2018).
- Declining Sierra Nevada Mountains snowpack levels, which account for approximately half of the surface water storage in California, by 70% over the next 100 years (Governor's Office of Planning and Research et al. 2018).
- Increasing the number of days conducive to ozone formation (e.g., clear days with intense sun light) by 25% to 85% (depending on the future temperature scenario) by the end of the twenty-first century in high ozone areas, including Southern California (California Natural Resources Agency 2018).
- Increasing the potential for erosion of California's coastlines and seawater intrusion into the Sacramento Delta and associated levee systems due to the rise in sea level (California Natural Resources Agency 2018).
- Exacerbating the severity of drought conditions in California such that durations and intensities are amplified, ultimately increasing the risk of wildfires and consequential damage incurred (California Natural Resources Agency 2018).

3.8.2 Environmental Impacts

This section describes the environmental impacts of the proposed Project in the context of GHGs and climate change. It describes the methods used to evaluate the impacts and the thresholds used to determine whether an impact would be significant. The section also identifies mitigation measures to reduce the level of significant impacts.

Methods for Analysis

Project-level GHG emissions and associated impacts were assessed using the same methods as described in Section 3.3, *Air Quality*. Refer to Appendix B for additional modeling detail, including equipment and vehicle assumptions.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the proposed Project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Generation of greenhouse gas 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 greenhouse gases.

Climate change is a global problem, and GHGs are global pollutants, unlike criteria air pollutants (such as ozone precursors, which are primarily pollutants of regional and local concern). Given their long atmospheric lifetimes (see Table 3.8-1), GHGs emitted by countless sources worldwide accumulate in the atmosphere. No single emitter of GHGs is large enough to trigger global climate change on its own. Rather, climate change is the result of the individual contributions of countless past, present, and future sources. Therefore, GHG impacts are inherently cumulative. Consequently, the BAAQMD, SJVAPCD, and other jurisdictions and agencies consider climate change to be a cumulative issue. Specifically, the BAAQMD indicates in its CEQA Guidelines:

> If annual emissions of operational-related GHGs exceed these threshold levels, the proposed project would result in a cumulatively considerable contribution of GHG emissions and a cumulatively significant impact to global climate change (Bay Area Air Quality Management District 2017).

Consequently, the evaluation of climate change impacts in this analysis represents a cumulative analysis.

Currently, BAAQMD and SJVAPCD do not identify an approach to assessing the significance of construction-related GHG emissions. However, cumulative greenhouse gas emissions typically associated with construction may be orders of magnitude lower than the operational emissions from the project, simply because construction emissions are generally short term in duration compared to the project's overall lifetime (Governor's Office of Planning and Research 2018). In addition, BAAQMD and SJVAPCD have operational GHG thresholds, but they are not applicable to the proposed Project.

Impacts and Mitigation Measures

Impact GHG-1: Generation of greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment (less than significant)

The PEIR concluded that while repowering the Altamont Pass Wind Resource Area (an aggregate of all the anticipated repowering projects proposed within the program area) would result in short-term emissions of GHGs, primarily associated with construction activities, and the potential operational emission of SF_6, the repowering projects collectively would result in an annual net reduction of more than 100,000 tons of CO_2e. This beneficial impact would be less than significant.

Table 3.8-3 summarizes estimated construction and operational GHG emissions associated with the Project. Unlike most regional and local criteria pollutants, GHG emissions are inherently cumulative and do not ascribe to air district boundaries. Accordingly, GHG emissions generated in BAAQMD and SJVAPCD during construction are summed together in 3.8-3.

The net effect on operational emissions during the first year of operation is also presented. Electricity produced by the statewide grid is generated in part by fossil-fueled sources (e.g., natural gas facilities). Because additional renewable resources will be integrated into the statewide electrical grid as a result of the RPS, the annual displaced emissions achieved by the Project will decline as a function of time (up to 100% renewable resources by 2045 pursuant to SB 100).

Table 3.8-3. GHG Emissions from Project Construction and Operation in BAAQMD (metric tons)

Source	CO_2	CH_4	N_2O	SF_6	CO_2e
Construction					
Laydown, substations, and switch yards	57	<1	<1	0	58
Road construction	185	<1	<1	0	188
Turbine foundations	263	<1	<1	0	269
Turbine delivery and installation	128	<1	<1	0	131
Utility collector line installation	61	<1	<1	0	63
O&M building construction[4]	21	<1	<1	0	21
Restoration and cleanup	88	<1	<1	0	89
Offsite truck trips	743	<1	<1	0	777
Offsite worker trips	93	<1	<1	0	94
Electricity use	1	<1	<1	0	1
Total	1,640	<1	<1	0	1,691
Amortized (per year for 30 years)					56
Operation					
Offsite worker trips	19	<1	<1	0	19
Maintenance/operation	46	<1	<1	0	47
Electricity use	1	<1	<1	0	1
Circuit breaker leakage	0	0	0	<1	22
Total	66	<1	<1	<1	89
Total annual construction and operation emissions					145
Annual GHG reductions from offsetting grid electricity (Year 1)[a]					-50,274
Annual net GHG emissions (Year 1)[a]					-50,128

CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; SF_6 = sulfur hexafluoride; CO_2e = carbon dioxide equivalent.; GHG = greenhouse gas.

[a] Reductions and emissions presented represent Year 1 of Project operation. Annual displaced emissions achieved by the Project will decline as a function of time as the statewide grid incorporates additional renewable sources over time.

As shown in Table 3.8-3, wind energy generated by the Project would reduce GHG emissions by approximately 50,000 metric tons CO_2e during its first year of operation. This would more than offset emissions generated by Project construction and operation. The Project would continue to generate emissions reductions until 2045, which is when state law requires the statewide grid to be 100% renewable. This impact would be less than significant, and no mitigation is required.

Impact GHG-2: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases (less than significant with mitigation)

The PEIR evaluated the repowering of the program area for consistency with the following measures relevant to GHG emissions.

[4] The O&M building is no longer a part of the Project. Therefore, emissions presented in the daily total is conservative and will likely be lower than shown. However, the significance conclusions are not anticipated to change.

- AB 32 Scoping Plan Measure T-7: Heavy-Duty Vehicle GHG Emission Reduction (Aerodynamic Efficiency)—Discrete Early Action.
- AB 32 Scoping Plan Measure E-3: Renewables Portfolio Standard.
- AB 32 Scoping Plan Measure H-6: High Global Warming Potential Gas Reductions from Stationary Sources – SF_6 Leak Reduction and Recycling in Electrical Applications.
- Alameda County CCAP Measure E-10**:** Require new construction to use building materials containing recycled content.
- Alameda County CCAP Measure WS-2: Strengthen the Construction and Demolition Debris Management Ordinance.

In concept, the proposed Project is being pursued to promote sustainability and further alternative energy. Although the measures included in the AB 32 Scoping Plan, *2017 Climate Change Scoping Plan*, and Alameda County CCAP are necessarily broad, the Project is generally consistent with the goals and desired outcomes of the plans. The additional wind energy generated by the Project would directly support the decarbonization of the electric power sector, helping California to meet the GHG goals contained in SB 32, SB 100, and EO B-55-18. Nevertheless, emissions generated by the Project could potentially conflict with applicable measures in the AB 32 Scoping Plan, *2017 Climate Change Scoping Plan*, and Alameda County CAP.

With the exception of Scoping Plan Measure E-3, the PEIR concluded that the repowering projects could potentially conflict with all these measures. However, implementation of 2019 Updated PEIR Mitigation Measure GHG-2a, *Implement best available control technology for heavy-duty vehicles*; and PEIR Mitigation Measures GHG-2b, *Install low SF_6 leak rate circuit breakers and monitoring*; GHG-2c, *Require new construction to use building materials containing recycled content*; and GHG-2d, *Comply with construction and demolition debris management ordinance*, would reduce this potential impact to a less-than-significant level. More specifically, the implementation of best available control technology for heavy-duty vehicles would limit GHG emissions, while the installation of low leak rate circuit breakers and monitoring would increase operational efficiencies and reduce GHG emissions. The use of recycled building materials and compliance with the construction and demolition debris management ordinance would also reduce GHG emissions associated with material production and landfill waste, respectively.

2019 Updated PEIR Mitigation Measure GHG-2a: Implement best available control technology for heavy-duty vehicles

The applicant will require existing trucks/trailers to be retrofitted with the best available technology and/or ARB-approved technology consistent with the ARB Truck and Bus Regulation (California Air Resources Board 2018c). The ARB Truck and Bus Regulation applies to all diesel-fueled trucks and buses with a gross vehicle weight rating (GVWR) greater than 14,000 pounds.

The applicant must replace lighter trucks (GVWR of 14,001 to 26,000 pounds) with engines that are 20 years or older with newer trucks. The Project has the option to install a PM filter retrofit on a lighter truck by 2014 to make the truck exempt from replacement until January 1, 2020, and any lighter truck equipped with a PM filter retrofit prior to July 2011 would receive credit toward the compliance requirements for a heavier truck or bus in the same fleet.

The applicant is required to meet the engine model year schedule shown below for heavier trucks (GVWR greater than 26,000 pounds). To comply with the schedule, the applicant will install the best available PM filter on 1996 model year and newer engines and would replace the vehicle 8 years later. The applicant will replace trucks with 1995 model year and older engines. Replacements with 2010 model year or newer engines meets the final requirements, but the applicant could also replace trucks with used trucks that would have a future compliance date on the schedule. For example, a replacement with a 2007 model year engine complies until 2023. By 2023 all trucks and buses must have 2010 model year engines with few exceptions.

Engine Model Year Schedule for Heavier Trucks	
Engine Model	Requirement from January 1
Pre-1994	No requirements until 2015, then 2010 engine
1994–1995	No requirements until 2016, then 2010 engine
1996–1999	PM filter from 2012 to 2020, then 2010 engine
2000–2004	PM filter from 2013 to 2021, then 2010 engine
2005–2006	PM filter from 2014 to 2022, then 2010 engine
2007–2009	No requirements until 2023, then 2010 engine
2010	Meets final requirements

PEIR Mitigation Measure GHG-2b: Install low SF6 leak rate circuit breakers and monitoring

The applicant will ensure that any new circuit breaker installed at a substation has a guaranteed SF_6 leak rate of 0.5% by volume or less. The applicant will provide Alameda County with documentation of compliance, such as specification sheets, prior to installation of the circuit breaker. In addition, the applicant will monitor the SF_6-containing circuit breakers at the substation consistent with Scoping Plan Measure H-6 for the detection and repair of leaks.

PEIR Mitigation Measure GHG-2c: Require new construction to use building materials containing recycled content

The applicant will require the construction of all new substation and other permanent buildings to incorporate materials for which the sum of post-consumer recycled content plus one-half of the post-industrial content constitutes at least 10% of the total value of the materials in the Project.

PEIR Mitigation Measure GHG-2d: Comply with construction and demolition debris management ordinance

The applicant will comply with the County's revised Green Building Ordinance regarding construction and demolition debris as follows: (1) 100% of inert waste and 50% wood/vegetative/scrap metal not including Alternative Daily Cover (ADC) and unsalvageable material will be put to other beneficial uses at landfills, and (2) 100% of inert materials (concrete and asphalt) will be recycled or put to beneficial reuse.

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3.9 Hazards and Hazardous Materials

The PEIR evaluated the potential for impacts relating to hazards and hazardous materials. Because the characteristics of the Project area and the activities associated with Project construction and operation are the same as those contemplated in the PEIR, existing hazards and hazardous conditions in the Project area are generally the same as those analyzed in the PEIR. The site-specific conditions are described below. The use of hazardous materials during Project construction, operations, and maintenance activities would be similar. Issues related to the Project's proximity to schools and airports are covered under the PEIR. Because of the larger generation capacity of the Project's proposed turbines, fewer turbines would be required. However, they would be larger and would, like all repowering projects, be subject to County review.

3.9.1 Existing Conditions

Regulatory Setting

Federal

Hazardous Materials and Waste Handling

The federal Resource Conservation and Recovery Act of 1976 (RCRA) established a "cradle-to-grave" regulatory program governing the generation, transportation, treatment, storage, and disposal of hazardous waste. Under RCRA, individual states may implement their own hazardous waste programs in lieu of RCRA as long as the state program is at least as stringent as federal RCRA requirements. In California, the Department of Toxic Substances Control (DTSC) regulates the generation, transportation, treatment, storage, and disposal of hazardous material waste. The hazardous waste regulations establish criteria for identifying, packaging, and labeling hazardous wastes; dictate the management of hazardous waste; establish permit requirements for hazardous waste treatment, storage, disposal, and transportation; and identify hazardous wastes that cannot be disposed of in landfills. These regulations also require hazardous materials users to prepare written plans, such as a Hazardous Materials Business Plan, that describe hazardous materials inventory information, storage and secondary containment facilities, emergency response and evacuation procedures, and employee hazardous materials training programs. A number of agencies participate in enforcing hazardous materials management requirements, including DTSC, the Regional Water Quality Control Boards, and the Alameda County Department of Environmental Health's Hazardous Materials/Waste Program.

Transportation of Hazardous Materials and Oversized Loads

The U.S. Department of Transportation regulates hazardous materials transportation on all interstate roads. Within California, the state agencies with primary responsibility for enforcing federal and state regulations and for responding to transportation emergencies are the California Highway Patrol (CHP) and the California Department of Transportation (Caltrans). Together, federal and state agencies determine driver-training requirements, load-labeling procedures, and container specifications. Although special requirements apply to transporting hazardous materials, requirements for transporting hazardous waste are more stringent, and hazardous waste haulers must be licensed to transport hazardous waste on public roads.

Caltrans has the discretionary authority to issue special permits for the movement of vehicles/loads exceeding statutory limitations on the size, weight, and loading of vehicles contained in Division 15 of the California Vehicle Code. Requests for such special permits require the completion and application for a Transportation Permit.

Aviation Hazards

Federal Aviation Administration (FAA) Regulations (14 Code of Federal Regulations [CFR] 77) establish standards for what constitutes an obstruction to navigable airspace. Obstructions include any object if it is: (1) 500 feet above ground level; (2) 200 feet above ground level or above the established airport elevation, whichever is higher, within 3 nautical miles of an airport; and (3) above a height within a terminal obstacle clearance area or en route obstacle clearance area. In addition, California Public Utilities Code section 21659 prohibits hazards near airports (as defined by 14 CFR 77) unless a permit allowing the construction is issued by the Caltrans Division of Aeronautics. FAA requires a developer to file a Notice of Proposed Construction (Form 7460) for any structure greater than 200 feet above ground level. The form requires a proposal for marking and lighting of wind turbines and towers. FAA determines if the proposed Project would create a hazard to navigable airspace and issues either a Determination of No Hazard or a Notice of Presumed Hazard.

State of California

California hazardous materials and wastes regulations are equal to or more stringent than federal regulations. The U.S. Environmental Protection Agency (EPA) has granted the state primary oversight responsibility to administer and enforce hazardous waste management programs. State regulations require planning and management to ensure that hazardous materials are handled, stored, and disposed of properly to reduce risks to human health and the environment. Several key state laws pertaining to hazardous materials and wastes are discussed below.

Worker Safety

Occupational safety standards exist in federal and state laws to minimize worker safety risks from both physical and chemical hazards in the work place. The California Division of Occupational Safety and Health (Cal/OSHA) and the federal Occupational Safety and Health Administration are the agencies responsible for assuring worker safety in the workplace.

Cal/OSHA assumes primary responsibility for developing and enforcing standards for safe workplaces and work practices within the state. At sites known to be contaminated, a site safety plan must be prepared to protect workers. The site safety plan establishes policies and procedures to protect workers and the public from exposure to potential hazards at the contaminated site.

Fire Protection

The California Public Resources Code (Section 4101 et seq.) includes fire safety requirements for which the Department of Forestry and Fire Protection (CalFire) has adopted regulations (for example, Chapters 6 and 7 of Chapter 1.5 of Title 14 of the California Code of Regulations [CCR]) that apply to state responsibility areas (SRAs). As the name implies, SRAs are areas where CalFire has primary responsibility for fire protection. During the fire hazard season, these regulations: (a) restrict the use of equipment that may produce a spark, flame, or fire; (b) require the use of spark arrestors[1] on equipment that has an internal combustion engine; (c) specify requirements for the safe use of gasoline-powered tools in fire hazard areas; and (d) specify fire-suppression equipment that must be provided onsite for various types of work in fire-prone areas.

SRAs include much of the wildlands in unincorporated Alameda County. According to CalFire's hazards area mapping, the program area is located in a zone that has a moderate to high risk for wildland fire hazards within the SRA (California Department of Forestry and Fire Protection 2007).

Local

Alameda County General Plan

The Safety Element of the *Alameda County General Plan* (Alameda County 2013) contains goals, policies, and actions the County might take related to nonnatural hazards and fire hazards. Many of the principles and actions refer to new development. Those relating to the proposed Project as an existing facility are excerpted below.

Goal 2. To reduce the risk of urban and wildland fire hazards.

P3. Development should generally be discouraged in areas of high wildland fire hazard where vegetation management programs, including the creation and maintenance of fuel breaks to separate urban uses would result in unacceptable impacts on open space, scenic and ecological conditions.

Goal 4. Minimize residents' exposure to the harmful effects of hazardous materials and waste.

P1. Uses involving the manufacture, use or storage of highly flammable (or toxic) materials and highly water reactive materials should be located at an adequate distance from other uses and should be regulated to minimize the risk of on-site and off-site personal injury and property damage. The transport of highly flammable materials by rail, truck, or pipeline should be regulated and monitored to minimize risk to adjoining uses.

East County Area Plan

The Hazard Zones and Environmental Health and Safety Elements of the *East County Area Plan* contain goals, policies, and programs related to hazards (Alameda County 2000).

Hazard Zones

Goal: To minimize the risks to lives and property due to environmental hazards.

Policy 134: The County shall not approve new development in areas with potential natural hazards (flooding, geologic, wildland fire, or other environmental hazards) unless the County can determine that feasible measures will be implemented to reduce the potential risk to acceptable levels, based on site-specific analysis.

Environmental Health and Safety

Program 117: The County shall work with the California Department of Forestry and Fire Protection to designate "very high fire hazard severity zones" in conformance with AB 337 (1992). The County shall ensure that all zones designated as such meet the standards and requirements contained in this legislation.

[1] A spark arrestor is a device that prohibits exhaust gases from an internal combustion engine from passing through the impeller blades where they could cause a spark. A carbon trap commonly is used to retain carbon particles from the exhaust.

Program 118: The County shall prepare a comprehensive wildland fire prevention program including fuelbreaks, brush management, controlled burning, and access for fire suppression equipment.

Alameda County Department of Environmental Health

The Alameda County Department of Environmental Health (ACDEH) is the Certified Unified Program Agency (CUPA) for Alameda County. This certification by the California Secretary of Environmental Protection authorizes the ACDEH to implement the Unified Hazardous Waste and Hazardous Materials Management Regulatory Program specified in Health and Safety Code Chapter 6.11 of Division 20 (beginning with Section 25404). As the CUPA, ACDEH oversees the regulatory programs for Hazardous Materials Business Plans, underground and aboveground storage tanks, onsite treatment of hazardous waste, hazardous waste generators, and California Accidental Release Prevention.

Contra Costa County Airport Land Use Compatibility Plan

The Contra Costa Airport Land Use Compatibility Plan (ALUCP) is designed to promote compatibility between the airports in Contra Costa County and surrounding land uses. The ALUCP, as adopted by the Contra Costa County Airport Land Use Commission (ALUC), designates compatibility criteria applicable to local agencies in their preparation or amendment of land use plans and ordinances and to land owners in their design of new development.

The ALUCP is primarily concerned with land uses near the two public-use airports in the county, Buchanan Field Airport and Byron Airport.

Policies applicable to the program are excerpted below (Contra Costa County 2000).

6.5 Compatibility Zone "C1" Criteria

6.5.4 *Height Limitations* – Unless specific exemption is granted (see Countywide Policy 4.3.2), the height of objects within Compatibility Zone C1 shall be limited in accordance with the Byron Airport Airspace Protection Surfaces drawing (Figure 4A).

(a) Generally, there is no concern with regard to any object up to 100 feet tall unless it is located on high ground or it is a solitary object (e.g., an antenna) more than 35 feet taller than other nearby objects.

(b) ALUC review is required for any proposed object taller than 100 feet.

6.7. Compatibility Zone "D" Criteria

6.7.4. Height Limitations — See criteria for Compatibility Zone C1.

6.8 Height Exception Overlay Zone

6.8.1. *Height Limitations* — Unless a specific exemption is granted (see Countywide Policy 4.3.2), the height of objects within the Height Exception Overlay Zone shall be limited in accordance with the Byron Airport Airspace Protection Surfaces drawing (Figure 4A).

(a) Objects within this zone may exceed the height limits established in accordance with federal airspace protection standards if the height is less than that of nearby objects or terrain.

(b) Generally, there is no concern with regard to any object up to 50 feet tall unless it is located on high ground or it is a solitary object (e.g., an antenna) more than 35 feet taller than other nearby objects.

(c) ALUC review is required for any proposed object taller than 50 feet.

6.8.2. Other Development Conditions

(a) Dedication of an avigation easement to Contra Costa County shall be required as a condition for approval of any development in this zone having a height in excess of 50 feet. See Countywide Policy 4.3.3.

(b) All other criteria of the underlying compatibility zone shall apply.

Best Management Practices

As discussed under Chapter 3.7, *Geology and Soils*, any future project that would disturb 1 or more acres of soil, or would disturb less than 1 acre but is part of a larger common plan of development must obtain coverage under General Permit Order 2010-0014-DWQ. Coverage under the General Permit requires development and implementation of a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP must include plans for erosion and sediment control and would adhere to the County's grading ordinance and BMPs. Typical construction erosion control BMPs are listed below.

- Perform clearing and earth moving activities only during dry weather.
- Limit construction access routes and stabilize designated access points.
- Prohibit cleaning, fueling, and maintaining vehicles onsite, except in a designated area where washwater is contained and treated.
- Properly store, handle, and dispose of construction materials/wastes to prevent contact with stormwater.
- Train and provide instruction to all employees/subcontractors on construction BMPs.
- Control and prevent discharge of all potential pollutants, including pavement cutting wastes, paints, concrete, petroleum products, chemicals, washwater or sediments, rinse water from architectural copper, and non-stormwater discharges to storm drains and watercourses.

Alameda County Wind Farm Standard Conditions

As discussed in Chapter 2, *Program Description*, there is no ordinance dictating setback conditions in Alameda County. Setback requirements originally developed for Alameda County windfarms in the 1980s and 1990s were typically applied to wind projects using older generation turbines; however, these requirements have been deemed inappropriate for the fourth-generation turbines proposed for repowering. Accordingly, the County has updated the existing standards to be used for proposed repowering projects as presented in Table 2-8.

Professional Standards for Environmental Site Assessments

The American Society of Testing and Materials (ASTM) established ASTM E 1527-03 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (Phase I ESA). The purpose of the ASTM standards is to identify, to the extent feasible, recognized environmental conditions in connection with a subject property. ASTM defines *recognized environmental condition* as the presence or likely presence of hazardous substances as defined by the federal Comprehensive Environmental Response, Compensation, and Liability Act, as well as conditions that indicate an existing release, a past release, or a material threat of a release of petroleum products into the ground, groundwater, or surface water.

According to ASTM, the Phase I ESA is a comprehensive assessment and is to be performed by an environmental professional. The duties of the environmental professional include three tasks: interviews and site reconnaissance, review and interpretation of information, and oversight of writing the report.

An environmental professional is defined as someone with at least one of the qualifications listed below.

- A current Professional Engineer's or Professional Geologist's license or registration from a state or U.S. territory with 3 years equivalent full-time experience.
- A Baccalaureate or higher degree from an accredited institution of higher education in a discipline of engineering or science and 5 years equivalent full-time experience.
- The equivalent of 10 years full-time experience.

Environmental Setting

The Project area is in the northeast portion of the program area north of I-580 near the Town of Byron. The conditions described in the PEIR also pertain to the Project area. The characteristics of the Project regarding the type of potential hazards in the area and the type and use of hazardous materials would not differ from those addressed in the PEIR. The potential for and type of blade throw, addressed in the discussion of Impact HAZ-8, would not differ from those hazards considered in the PEIR; however, discussion of the larger turbines is included for purposes of full disclosure.

There are no public or private K–12 schools within 0.25 mile of the Project area. The nearest school, Mountain House Elementary School, is approximately 0.80 mile east of the nearest Project facilities.

The closest public airport to the Project area is the Byron Airport, approximately 2.7 miles north of the Project area. Livermore Municipal Airport is approximately 11.4 miles southwest of the Project area, and Tracy Municipal Airport is approximately 8 miles southeast of the Project area.

3.9.2 Environmental Impacts

This section describes the impact analysis relating to hazards and hazardous materials for the Project. It describes the methods used to determine the impacts of the Project and lists the thresholds used to conclude whether an impact would be significant. If applicable, measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany each impact discussion.

Methods for Analysis

Identifying impacts relating to hazards and hazardous materials for the Project involved a review of information from published maps, reports, Alameda County general plan documents, the County's updated setback requirements, telephone interviews with fire protection agencies, and other documents that describe the potential for hazards and hazardous materials occurrence in the APWRA.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the proposed Project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Creation of a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.
- Creation of a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.
- Emission of hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.
- Placement of Project-related facilities on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and resulting creation of a significant hazard to the public or the environment.
- Placement of Project-related facilities within an airport land use plan area or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, resulting in a safety hazard or excessive noise for people residing or working in the Project area.
- Impairment of implementation of or physical interference with an adopted emergency response plan or emergency evacuation plan.
- Exposure of people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires.

Impacts and Mitigation Measures

Impact HAZ-1: Creation of a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials (less than significant)

Construction of the Project would involve small quantities of commonly used materials, such as fuels and oils, to operate construction equipment. However, because standard construction BMPs would be implemented to reduce pollutant emissions during construction, this impact is considered less than significant.

The majority of hazardous materials to be used during operations, decommissioning, and removal and reclamation activities—fuels, oils, and lubricants—are of low toxicity. As these materials are required for operation of construction vehicles and equipment, BMPs would be implemented to reduce the potential for or exposure to accidental spills involving the use of hazardous materials. In addition, a Hazardous Materials Business Plan (HMBP) would be developed for the proposed Project. The HMBP would contain specific information regarding the types and quantities of hazardous materials, as well as their production, use, storage, spill response, transport, and disposal. Adherence to BMPs and HMBP designed to limit worker exposure to hazardous materials would be required and would reduce the potential for construction worker's exposure to hazards and hazardous materials.

Lubricants used in the turbine gearbox are potentially hazardous. The gearbox would be sealed to prevent lubricant leakage and would be periodically tested. When the lubricants have degraded to the point where they are no longer adequate, the gearbox would be drained, new lubricant added, and the used lubricants disposed of at an appropriate facility in accordance with all applicable laws and regulations.

Dielectric fluid to be used in transformers is biodegradable, contains no PCBs, and is not considered a hazardous material. Accordingly, the potential for hazardous materials to endanger the public or the environment is less than significant, and no mitigation is required.

Impact HAZ-2: Creation of a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment (less than significant)

Site workers, the public, and the environment could be inadvertently exposed to preexisting onsite contaminants during Project construction. Small quantities of potentially toxic substances (such as petroleum and other chemicals used to operate and maintain construction equipment) would be used in the Project area and transported to and from the area during construction. During operation, larger quantities (more than 55 gallons of liquid, 500 pounds of solids, or 200 cubic feet of compressed gases) of fuel could be stored in the Project area. In addition, fuel and other petroleum products could be stored onsite. Release of these hazardous materials into the environment would be a significant impact.

However, as previously discussed, an HMBP would be developed for the Project. The HMBP would contain specific information regarding the types and quantities of hazardous materials, as well as production, use, storage, spill response, transport, and disposal of such materials. The handling and disposal of these materials would be governed according to regulations enforced by CUPA, Cal/OSHA, and DTSC, as previously discussed. In addition, regulations under the federal Clean Water Act require contractors to avoid allowing the release of materials into surface waters as part of their SWPPP and National Pollutant Discharge Elimination System permit requirements (see Section 3.10, *Hydrology and Water Quality*, for a discussion of the Clean Water Act and SWPPPs). This regulatory scheme would ensure that safety measures and precautions are taken, thereby reducing any potential impacts associated with the accidental upset or release of hazardous materials. This impact would be less than significant, and no mitigation is required.

Impact HAZ-3: Emission of hazardous emissions or handling of hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school (no impact)

There are no public or private K–12 schools within 0.25 mile of the Project area. The nearest school is approximately 0.80 mile east of proposed wind facilities and it is unlikely that hazardous materials would be emitted or released within 0.25 mile of any schools. Also, implementation of the SWPPP by contractors would reduce the potential of a hazardous spill incident. There would be no impact. No mitigation is required.

Impact HAZ-4: Placement of Project-related facilities on a site that is included on a list of hazardous materials sites, and resulting creation of a significant hazard to the public or the environment (less than significant with mitigation)

A preliminary records check was conducted of the EnviroStor website (Department of Toxic Substances Control 2019), and the GeoTracker website (State Water Resources Control Board 2019). The area searched encompassed a 0.25-mile radius around the Project area and identified two facilities (Department of Toxic Substances Control 2019). Byron Power Company site is located approximately 0.18 miles north of the Project area. Groundwater contamination of petroleum hydrocarbons (i.e., diesel) was reported on July 29, 2011. Subsequently, remediation of the site commenced and the case closed on May 20, 2014 (State Water Resources Control Board 2019).

Soil contamination of an unknown substance was reported on March 1, 2011 at Aquachlor, located approximately 0.16 miles south of the Project area near Altamont Pass Road. The case was closed as of September 13, 2016 (State Water Resources Control Board 2019) No other hazardous materials properties were identified within 0.25 miles of the Project area.

The Project would involve soil disturbance. As outlined in the PEIR, a Phase I Environmental Site Assessment (and remediation, if necessary) is required for all projects requiring a Conditional Use Permit (CUP) prior to construction activities as a standard condition of approval for the CUP. Accordingly, implementation of the *2*019 Updated PEIR Mitigation Measure HAZ-4, *Perform a Phase I Environmental Site Assessment prior to construction activities and remediate if necessary*, would reduce this impact to a less-than-significant level.

2019 Updated PEIR Mitigation Measure HAZ-4: Perform a Phase I Environmental Site Assessment prior to construction activities and remediate if necessary

Prior to construction, the Project proponent will conduct a Phase I environmental site assessment in conformance with the American Society for Testing and Materials Standard Practice E1527-13. All environmental investigation, sampling, and remediation activities associated with properties in the Project area will be conducted under a work plan approved by the regulatory oversight agency and will be conducted by the appropriate environmental professional consistent with Phase I site assessment requirements as detailed below. The results of any investigation and/or remediation activities conducted in the Project area will be included in the Project-level EIR.

A Phase I environmental site assessment should, at a minimum, include the components listed below.

- An onsite visit to identify current conditions (e.g., vegetative dieback, chemical spill residue, presence of above- or underground storage tanks).
- An evaluation of possible risks posed by neighboring properties.
- Interviews with persons knowledgeable about the site's history (e.g., current or previous property owners, property managers).
- An examination of local planning files to check prior land uses and any permits granted.
- File searches with appropriate agencies (e.g., State Water Resources Control Board, fire department, County health department) having oversight authority relative to water quality and groundwater and soil contamination.
- Examination of historical aerial photography of the site and adjacent properties.
- A review of current and historic topographic maps of the site to determine drainage patterns.
- An examination of chain-of-title for environmental liens and/or activity and land use limitations.

If the Phase I environmental site assessment indicates likely site contamination, a Phase II environmental site assessment will be performed (also by an environmental professional).

A Phase II environmental site assessment would comprise the following.

- Collection of original surface and/or subsurface samples of soil, groundwater, and building materials to analyze for quantities of various contaminants.
- An analysis to determine the vertical and horizontal extent of contamination (if the evidence from sampling shows contamination).

If contamination is uncovered as part of Phase I or II environmental site assessments, remediation will be required. If materials such as asbestos-containing materials, lead-based paint, or PCB-containing equipment are identified, these materials will be properly managed and disposed of prior to or during the demolition process.

Any contaminated soil identified on a Project site must be properly disposed of in accordance with DTSC regulations in effect at the time.

Hazardous wastes generated by the proposed Project will be managed in accordance with the California Hazardous Waste Control Law (HSC, Division 20, Chapter 6.5) and the Hazardous Waste Control Regulation (Title 22, CCR, Division 4.5).

If, during construction/demolition of structures, soil or groundwater contamination is suspected, the construction/demolition activities will cease and appropriate health and safety procedures will be implemented, including the use of appropriate personal protective equipment (e.g., respiratory protection, protective clothing, helmets, goggles).

Impact HAZ-5: Placement of Project-related facilities within an airport land use plan area or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, resulting in a safety hazard or excessive noise for people residing or working in the Project area (less than significant)

Because the Project area is not within 2 miles of a public airport, implementation of the Project would not normally result in a safety hazard for people residing or working in the Project area.

However, according to the PEIR, projects with facilities in the influence area zones of local airports are required to submit a Notice of Proposed Construction or Alteration form to the FAA for review and to implement all FAA requirements to reduce potential aviation impacts. A review of the Byron Airport influence area zone indicates that the Project area is outside all influence area zones. Also, wind turbines would require FAA lighting as most would be more than 200 feet tall and must be individually lit with obstruction lighting. Through its Notice of Proposed Construction or Alteration (Form 7460.1), the FAA would review the proposed Project prior to construction (14 CFR Part 77). The FAA analysis would include a review of proposed marking (paint scheme) and nighttime lighting to ensure that aircraft could readily identify and avoid the wind turbines. Compliance with FAA requirements would reduce the project's potential aviation safety impacts to an acceptable level of risk and therefore to a less-than-significant level.

Impact HAZ-6: Impairment of implementation of or physical interference with an adopted emergency response plan or emergency evacuation plan (less than significant with mitigation)

Vehicular traffic associated with operations and maintenance of legacy facilities is not anticipated to change under the proposed Project except that it may be reduced due to fewer, newer turbines that will require less maintenance. Accordingly, operation of the Project would have no impact.

During construction, there would be an increase in vehicular traffic transporting work crews, equipment, and materials. Construction traffic routing would be established in a Construction Traffic Control Plan as described in Section 3.16 *Transportation* and would include a traffic safety and signing plan prepared by the Project engineers in coordination with Alameda County and other related agencies. The plan would define hours, routes, and safety and management requirements. The Project would therefore not conflict with any adopted emergency response plan or emergency evacuation plan. Implementation of PEIR Mitigation Measure TRA-1 would reduce potential impacts to a less-than-significant level by ensuring traffic is routed to reduce potential impacts.

PEIR Mitigation Measure TRA-1: Develop and implement a construction traffic control plan

Impact HAZ-7: Exposure of people or structures, either directly or indirectly, to a significant risk involving wildland fires (less than significant)

The Project area consists primarily of grassland and grazing land. Dry climate conditions create circumstances rich with fuels, although active grazing, agricultural irrigation, and landscape irrigation provide some fuel reduction. Human activities are the primary reason wildfires start, although lightning strikes do occasionally occur. As discussed in Section 3.19 *Wildfire*, the most likely source of an ignition from the Project would be hardware or conductor failures of power collection lines, dropping of collection lines, turbine malfunction or mechanical failure, and avian-related incidents. In addition, during construction, additional work crews would be required, temporarily increasing the number of vehicles in the Project area. Climate conditions together with the potential for vehicle-related ignitions increase the potential for ignition, especially during the summer months.

The potential for wildland fires however, already exists in the Project area due to the presence of the existing wind energy facilities. Moreover, the improved safety of newer models associated with repowered projects are anticipated to result in a reduction of potential fire ignitions. Because CalFire and the Alameda County Fire Department already provide fire protection services to the Project area, the fire protection facilities and infrastructure required to protect the existing facilities are in place. During construction, temporary onsite water tanks and water trucks would be made available, in part, for fire water support.

The PEIR concluded that the fire-related impact of individual repowering projects would be less than significant, and no mitigation is required. The Project would also comply with the Altamont Pass Wind Farms Fire Requirements as described in Exhibit C of the 2005 CUPs. Therefore, the potential for exposure of people or structures to a significant risk of loss, injury, or death involving wildland fires is less than significant, and no mitigation is required.

Impact HAZ-8: During normal operation, the effects of bending and stress on rotor blades over time could lead to blade failure and become a potential blade throw hazard (less than significant with mitigation)

There is no ordinance dictating setback conditions in Alameda County; rather, setbacks are determined on a project-by-project basis in accordance with the standard conditions of approval for a CUP. Setback requirements are described in Table 2-8 *Alameda County Turbine Setback Requirements* in Chapter 2, *Project Description.* These requirements have two setback options (standard minimum setback and reduced optional setback with conditions) for turbine siting relative to certain land uses. Table 2-8 has been updated by the County as described and presented in Chapter 2 Project Description. Table 3.9-1 shows the minimum setback distances for both setback options and the approximate distances between land uses and proposed turbines.

Table 3.9-1. Distances between Proposed Turbines and Land Uses

	Standard Minimum Setback	Reduced Optional Setback with Conditions	Distance from Closest Proposed Turbine
Residence	3 times TTH (456 m)	1.5 times TTH (228 m)	305 m
Recreation Area – Bethany Reservoir	1.25 times TTH (190 m)	1.0 times TTH (152 m)	229 m
Public Road – Interstate 580	2.5 times TTH (380 m)	1.25 times TTH (190 m)	195 m

Persons, structures, and facilities within the blade throw hazard zone could be at risk of damage, injury, or death if struck by a falling blade. People potentially within the hazard zone include motorists travelling along I-580 and county roads and those occupying residences. The important infrastructure in and adjacent to the project area potentially susceptible to damage from blade throw includes PG&E transmission lines and windfarm substations. Overall, the strict control of public access would reduce the risk of potential blade strike in the project area.

Turbines being considered would have a maximum total turbine height (TTH) of 152 meters. The closest proposed turbine to a residence is approximately 305 meters. Although that distance is less than the Standard Minimum Setback, it would be allowed under the Reduced Optional Setback with Conditions if a notarized agreement or easement was secured. Notarized agreements have been obtained from homeowners in the proposed project area.

The closest recreational area (Bethany Reservoir) to a proposed turbine is approximately 229 meters in distance. This distance is considered an adequate setback distance under both setback options and potential blade throw impacts would be less than significant.

For public roads, the minimum distance to ensure safety from blade throw hazard would be approximately 190 meters. The closest proposed turbine is approximately 195 meters from I-580. Although that distance is less than the Standard Minimum Setback, it would be allowed under the Reduced Optional Setback with Conditions. A turbine sited this close to a major highway could, in the event of a blade throw incident, endanger highway drivers. This is considered a significant impact. Implementation of New Mitigation Measure HAZ-8, however, would reduce potential blade throw impacts to a less-than-significant level by ensuring turbines are sited a safe distance from public roads.

2019 NEW Mitigation Measure HAZ-8: Site Turbines at least 1.25 times TTH from Public Roads and Prepare a Blade Throw Study if Necessary

The Project proponent will re-site or remove any proposed turbines that are less than 1.25 times TTH. Turbines re-sited at least 2.5 times TTH from public roads would meet standard setback requirements and no further action would be necessary. Turbines re-sited less than 2.5 times TTH from public roads, would require preparation of a blade throw study. The blade throw study must be prepared by a qualified professional engineer, subject to approval by the Planning Director.

3.9.3 References Cited

Printed References

Alameda County. 2000. *East County Area Plan*. Adopted May 1994. Modified by passage of Measure D, effective December 22, 2000. Oakland, CA.

Department of Toxic Substances Control. 2019. EnviroStor Database. Accessed on February 12, 2019. Accessed at: https://www.envirostor.dtsc.ca.gov.

State Water Resources Control Board. 2019. GeoTracker Database. Available: http://geotracker.waterboards.ca.gov. Accessed: February 12, 2019.

3.10 Hydrology and Water Quality

This section describes the environmental and regulatory setting for hydrology and water quality. It also describes impacts on hydrology and water quality that would result from implementation of the proposed Project and mitigation for significant impacts where feasible and appropriate.

3.10.1 Existing Conditions

Regulatory Setting

Federal

Clean Water Act

The following are potentially applicable sections of the Clean Water Act (CWA) (33 United States Code 1251–13176).

Section 303 and 305—Total Maximum Daily Load Program

The State of California adopts water quality standards to protect beneficial uses of state waters as required by CWA 303 Total Maximum Daily Load Program and the State's Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne Act). CWA 303(d) established the total maximum daily load (TMDL) process to guide the application of state water quality standards (see the discussion of state water quality standards below). To identify candidate water bodies for TMDL analysis, a list of water-quality–limited streams is generated. Such streams are considered to be impaired by the presence of pollutants, including sediments, and to have no additional capacity for these pollutants.

In addition to the impaired water body list required by CWA Section 303(d), CWA Section 305(b) requires states to develop a report that assesses statewide surface water quality. Both CWA requirements are addressed through the development of a 303(d)/305(b) Integrated Report, which provides both an update to the 303(d) list and a 305(b) assessment of statewide water quality. The State Water Resources Control Board's (State Water Board's) statewide 2014/2016 California Integrated Report was based on Integrated Reports from each of the nine Regional Water Quality Control Boards (Regional Water Boards). After approval of the Section 303(d) list portion of the California Integrated Report by the State Water Board, the complete 2014 and 2016 California Integrated Report was approved by the U.S. Environmental Protection Agency (EPA) on April 6, 2018.

Section 401—Water Quality Certification

CWA Section 401 requires that an applicant pursuing a federal permit to conduct any activity that may result in a discharge of a pollutant obtain a water quality certification (or waiver). Water quality certifications are issued by the Regional Water Boards in California. The San Francisco Bay Regional Water Board is responsible for the Bay Area and the Central Valley Water Board is responsible for the Central Valley. Because the proposed Project area drains to the Central Valley and to San Francisco Bay, it is under the jurisdiction of both the Central Valley Water Board and the San Francisco Bay Regional Water Board. Under the CWA, the state (as implemented by the relevant Regional Water Board) must issue or waive CWA Section 401 water quality certification for a Project to be permitted under CWA Section 404. Water quality certification requires the evaluation of water quality considerations associated with dredging or the placement of fill materials into waters of the United States. Construction of the proposed Project would require CWA 401 certification for the Project if CWA Section 404 requirements are triggered.

Section 402—National Pollutant Discharge Elimination System Program

The 1972 amendments to the federal Water Pollution Control Act established the National Pollutant Discharge Elimination System (NPDES) permit program to control discharges of pollutants from point sources (CWA Section 402). The 1987 amendments to the CWA created a new section of CWA devoted to stormwater permitting (CWA 402[p]). EPA has granted the State of California primacy in administering and enforcing the provisions of CWA and the NPDES permit program. The NPDES permit program is the primary federal program that regulates point-source and nonpoint-source discharges to waters of the United States.

The State Water Board issues both general and individual permits for certain activities. Although implemented at the state and local level, relevant general and individual NPDES permits are discussed below.

Construction Activities

Dischargers whose projects disturb 1 or more acres of soil or whose projects disturb less than 1 acre but are part of a larger common plan of development that in total disturbs 1 or more acres are required to file a notice of intent to obtain coverage under the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ, as amended by 2010-0014-DWQ and 2012-006-DWQ) (Construction General Permit). Construction activities subject to this permit include clearing, grading, and disturbances to the ground such as stockpiling or excavation, but do not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility.

The Construction General Permit requires the preparation and implementation of a stormwater pollution prevention plan (SWPPP), which must be completed before construction begins. The SWPPP should contain a site map that shows the construction site perimeter; existing and proposed buildings, lots, roadways, and stormwater collection and discharge points; general topography both before and after construction; and drainage patterns across the project site. The SWPPP must list best management practices (BMPs) the discharger will use to manage stormwater runoff and the placement of those BMPs. Additionally, the SWPPP must contain a visual monitoring program; a monitoring program for pollutants that are not visible to be implemented if there is a failure of BMPs; and a pH and turbidity monitoring program if the site discharges to a water body listed on the 303(d) list for sediment. The Construction General Permit describes the elements that must be contained in a SWPPP.

Post-Construction Stormwater Management

The individual NPDES permit (under Provision C.3, San Francisco Bay Regional Water Board areas only) requires that permanent water quality control devices treat all stormwater to the maximum extent practicable and result in no additional runoff. Runoff from new impervious surfaces of 10,000 square feet or more must be sized according to the volume or rate criteria identified in the permit. After treatment devices are installed, owners must enter into a maintenance agreement with the County to ensure the treatment devices are maintained, inspected, and reported on annually. Low impact development (LID) facilities are required for a project unless the project is eligible for LID reduction credit. LID includes rainwater harvesting, infiltration, and bio treatment.

Section 404—Permits for Fill Placement in Waters and Wetlands

CWA Section 404 regulates the discharge of dredged and fill materials into *waters of the United States*, which include oceans, bays, rivers, streams, lakes, ponds, and wetlands. Project proponents must obtain a permit from the U.S. Army Corps of Engineers (USACE) for all discharges of dredged or fill material into waters of the United States before proceeding with a proposed activity. Before any actions that may affect surface waters are implemented, a delineation of jurisdictional waters of the United States must be completed, following USACE protocols, to determine whether the study area contains wetlands or other waters of the United States that qualify for CWA protection. These areas include the following.

- Sections within the ordinary high water mark of a stream, including non-perennial streams with a defined bed and bank and any stream channel that conveys natural runoff, even if it has been realigned.
- Seasonal and perennial wetlands, including coastal wetlands.

Section 404 permits may be issued for only the least environmentally damaging practical alternative (i.e., authorization of a proposed discharge is prohibited if there is a practical alternative that would have fewer significant effects and lacks other significant consequences). Section 404 might apply if construction were proposed within waters of the United States.

State

Porter-Cologne Water Quality Control Act of 1969

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act) established the State Water Board and divided the state into nine regional basins, each with a Regional Water Board. The State Water Board is the primary state agency responsible for protecting the quality of the state's surface and groundwater supplies, while the regional boards are responsible for developing and enforcing water quality objectives and implementation plans.

The Porter-Cologne Act authorizes the State Water Board to enact state policies regarding water quality in accordance with CWA 303. In addition, the act authorizes the State Water Board to issue waste discharge requirements (WDRs) for projects that would discharge to state waters. The Porter-Cologne Act requires that the State Water Board or the Regional Water Board adopt water quality control plans (basin plans) for the protection of water quality. A basin plan must perform the following functions.

- Identify beneficial uses of water to be protected.
- Establish water quality objectives for the reasonable protection of the beneficial uses.
- Establish a program of implementation for achieving the water quality objectives.

Basin plans also provide the technical basis for determining WDRs, taking enforcement actions, and evaluating clean water grant proposals. Basin plans are updated and reviewed every 3 years in accordance with Article 3 of Porter-Cologne Act and CWA 303(c) (Central Valley Regional Water Quality Control Board 2018).

California Regional Water Quality Control Board and Central Valley Water Board Basin Plan

Water quality in streams and aquifers of the region is guided and regulated by the respective Regional Water Board basin plans. State policy for water quality control is directed at achieving the highest water quality consistent with the maximum benefit to the people of the state. The Project is under the jurisdiction of the Central Valley Water Board, which established regulatory standards and objectives for water quality in its Water Quality Control Plan for the Sacramento and San Joaquin River Basins, commonly referred to as the Basin Plan. To develop water quality standards consistent with the uses of a water body, the Regional Water Boards classify existing and potential beneficial uses for the Central Valley waters as part of their basin plan.

In general, beneficial uses can be classified to include municipal supply, cold freshwater habitat, groundwater recharge, fish migration, water contact recreation, noncontact water recreation, fish spawning, warm freshwater habitat, rare species habitat, and wildlife habitat (Central Valley Regional Water Quality Control Board 2018).

Local

Alameda County Stormwater Management Plan

The Department of Environmental Health developed a formal agreement with Public Works Agency to implement the industrial and commercial component of the Alameda Countywide Clean Water Program's Stormwater Management Plan for unincorporated Alameda County. The program includes inspection of facilities for compliance with the clean water regulations, outreach and education of best management practices to business owners, inspections for enforcement action, and creation and maintenance of a database of businesses in Alameda County unincorporated area for the Clean Water Program. This program also addresses items addressed above under *Construction Activities* in the *Federal* subsection.

East County Area Plan

Relevant components of the *East County Area Plan* to meet water quality goals for surface and groundwater are listed below (Alameda County 2000). These policies and implementation programs address similar components as in the *Alameda County General Plan*.

Policies

Policy 306: The County shall protect surface and groundwater resources by:

- preserving areas with prime percolation capabilities and minimizing placement of potential sources of pollution in such areas;
- minimizing sedimentation and erosion through control of grading, quarrying, cutting of trees, removal of vegetation, placement of roads and bridges, use of off-road vehicles, and animal-related disturbance of the soil;
- not allowing the development of septic systems, automobile dismantlers, waste disposal
- facilities, industries utilizing toxic chemicals, and other potentially polluting substances in creekside, reservoir, or high groundwater table areas when polluting substances could come in contact with flood waters, permanently or seasonally high groundwaters, flowing stream or creek waters, or reservoir waters; and,
- avoiding establishment of excessive concentrations of septic systems over large land areas.

Implementation Programs

Program 108: The County shall implement all federal, state and locally imposed statutes, regulations, and orders that apply to storm water quality. Examples of these include, but are not limited to:

- National Pollutant Discharge Elimination System (NPDES) stormwater permit issued by the California Regional Water Quality Control Board (RWQCB) to the Alameda County Urban Runoff Clean Water Program and amendments thereto;
- State of California NPDES General Permit for Storm Water Discharges (General Industrial Permit, General Construction Permit) and amendments thereto;
- Coastal Zone Management Act;
- Coastal Zone Act Reauthorization Amendments;
- Water Quality Control Plan, San Francisco Bay Basin Region (Basin Plan) and amendments thereto; and
- Letters issued by the RWQCB under the California Porter-Cologne Water Quality Act.

Program 109: The County shall endeavor to minimize herbicide use by public agencies by reviewing existing use and applying integrated pest management principles, such as mowing and mulching, in addition to eliminating or scaling back the need for vegetation control in the design phase of a project.

Program 110: The County shall conform with Alameda County Flood Control and Water Conservation District's (Zone 7) Wastewater Management Plan and the Regional Water Quality Control Board's San Francisco Bay Basin Plan.

Environmental Setting

Surface Water and Drainage

The Project area is southwest of the San Joaquin–Sacramento Delta (Delta) in unincorporated northern Alameda County. Figure 3.10-1 shows the drainages in and around the Project area. The majority of the Project area—comprising (from north to south) the Brushy Creek, Clifton Court Forebay, Mountain House Creek, Lower Old River, Lower Corral Hollow Creek, and Upper Corral Hollow Creek watersheds—flow generally east toward the Central Valley. A narrower strip along the western portion of the Project area—comprising the Upper Arroyo Las Positas and Arroyo Seco watersheds—drains west toward San Francisco Bay.

A portion of runoff enters a drainage ditch that borders the Project area on the east, and some runoff enters a canal that bisects the southern portion of the Project area; both features drain to Mountain House Creek, a tributary of Old River. Bethany Reservoir and the California Aqueduct are located between, but outside, two sections of the Project area. The Delta-Mendota Canal is northeast of the Project area.

Mountain House Creek (from Altamont Pass to Old River, Alameda and San Joaquin Counties; partly in Delta Waterways, southern portion) is listed as impaired for chloride and salinity under CWA Section 303(d). Old River (San Joaquin River to Delta-Mendota Canal; in Delta Waterways, southern portion) is impaired for chlorpyrifos, electrical conductivity, total dissolved solids (TDS), and low dissolved oxygen, under CWA Section 303(d) (State Water Resources Control Board 2018).

Groundwater Resources

The Project area is in the Tracy Subbasin (Basin Number 5-22.15). There are no published groundwater storage amounts for the entire basin; however, estimated groundwater storage capacity is approximately 4,040,000 acre-feet. Review of hydrographs for the Tracy Subbasin indicates that, except for some seasonal variation resulting from recharge and pumping, the majority of water levels in wells remained relatively stable over at least 10 years (California Department of Water Resources 2006).

Groundwater quality in the subbasin is characterized by a sodium water type and the southern part of the subbasin is characterized by calcium-sodium water type. The northern part of the subbasin is also characterized by a wide range of anionic water types including: bicarbonate; chloride; and mixed bicarbonate-chloride types. TDS concentrations in well water samples range from 50 to 3,520 milligrams per liter (mg/L), with an average of 463 mg/L. Areas of poor water quality exist throughout the subbasin. Elevated levels of chloride occur in several areas along the western side of the subbasin along with areas of elevated boron concentrations (California Department of Water Resources 2006).

Flooding

The Project area is outside of the Federal Emergency Management Agency (FEMA) 100-year floodplain (see Figure 3.10-1), as identified on a Flood Insurance Rate Map.

3.10.2 Environmental Impacts

This section describes the impact analysis related to hydrology and water quality for the proposed Project. It describes the methods used to determine the impacts of the Project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany the discussion of each identified significant impact.

Methods for Analysis

All Project elements were analyzed by comparing baseline conditions, as described in Section 3.10.1, *Existing Conditions*, to conditions during construction and operation of the Project. The analysis focuses on issues related to surface hydrology, groundwater supply, surface water and groundwater quality, and flood hazards. The key construction-related impacts were identified and evaluated qualitatively, based on the physical characteristics of the Project area and the magnitude, intensity, location, and duration of activities.

The evaluation of surface water hydrology impacts considers potential changes in the physical characteristics of waterbodies, impervious surfaces, and drainage patterns throughout the Project area as a result of Project implementation. Impacts on groundwater supply and recharge are analyzed by comparing existing groundwater use and recharge capabilities with Project conditions. Recharge is determined by the ability of water to infiltrate into the soil. Impacts on surface water and groundwater quality are analyzed by comparing existing water quality conditions with potential water quality conditions during Project implementation. Potential Project-related sources of water contaminants generated by industrial and Project operational activities, such as vehicle use, operation and maintenance, trash generation, and the storage or inadvertent release of hazardous materials during Project construction, are considered. The potential for water quality objectives to

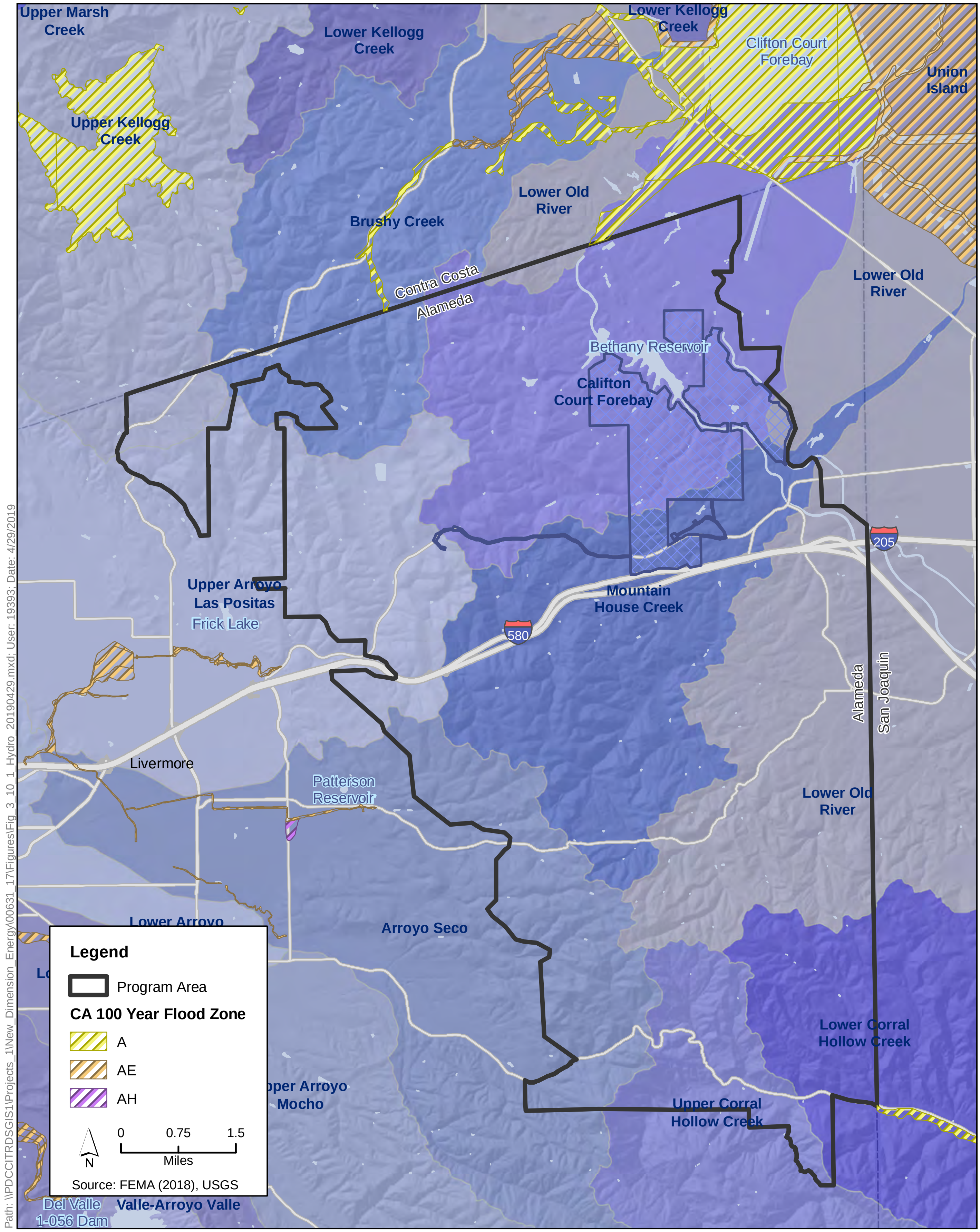

Figure 3.10-1
Watersheds and Floodplains in the Program Area

be exceeded and beneficial uses to be compromised is also considered. The impact analysis for flood risk uses FEMA mapping to determine the existing flood zone.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the proposed Project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Violation of any water quality standards or waste discharge requirements or other substantial degradation of surface water or groundwater quality.
- Substantial decrease of groundwater supplies or substantial interference with groundwater recharge such that the Project may impede sustainable groundwater management of the basin.
- Substantial alteration of the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would result in any of the following:
  - Substantial erosion or siltation onsite or offsite.
  - Substantial increase in the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite.
  - Creation of or contribution to runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
  - Impeding or redirecting flood flows.
- In flood hazard, tsunami, or seiche zones, risk of release of pollutants as a result of Project inundation.
- Conflict with or obstruction of implementation of a water quality control plan or sustainable groundwater management plan.

Impacts and Mitigation Measures

Project Impacts

Impact WQ-1: Violation of any water quality standards or waste discharge requirements or other degradation of surface water or groundwater quality (less than significant with mitigation)

Construction-related earth-disturbing activities associated with the Project would introduce the potential for increased erosion and sedimentation, with subsequent effects on drainage and water quality. During construction, trenching, site preparation, and other construction activities would create areas of bare soil that can be exposed to erosive forces. Bare soils are much more likely to erode than vegetated areas because of the lack of dispersion, infiltration, and retention properties created by covering vegetation. Construction activities involving soil disturbance, excavation, cutting/filling, stockpiling, and grading could result in increased erosion and sedimentation that can increase sediment discharge to surface waters, if proper BMPs are not used.

Existing activities in the Project area may already result in the release of sediment, and the extent of earth disturbance resulting from construction of the Project is anticipated to result in a new and intensified potential for the release of sediments from staging areas and turbine construction sites. If precautions are not taken to contain or capture sedimentation, earth-disturbing construction activities could result in substantial sedimentation in stormwater runoff and result in a significant impact on existing surface water quality.

Project operation is not anticipated to result in a substantial amount of additional runoff that would degrade surface or groundwater quality. Implementation of PEIR Mitigation Measure WQ-1*, Comply with NPDES requirements*, would minimize the potential erosion- and sedimentation-related water quality impacts by requiring implementation of erosion control BMPs and a SWPPP. Implementation of PEIR Mitigation Measure WQ-1 would reduce this impact to a less-than-significant level.

PEIR Mitigation Measure WQ-1: Comply with NPDES requirements

Project contractors will obtain coverage under the Construction General Permit before the onset of any construction activities, because the Project would disturb 1 acre or more. A SWPPP will be developed by a qualified engineer or erosion control specialist in accordance with the appropriate Water Board's requirements for NPDES compliance and implemented prior to the issuance of any grading permit. The SWPPP will be kept onsite during construction activities and will be made available upon request to representatives of the Regional Water Boards.

Compliance and coverage with the local stormwater management programs and Construction General Permit will require controls of pollutant discharges that utilize BMPs and technology to reduce erosion and sediments to meet water quality standards. BMPs may consist of a wide variety of measures taken to reduce pollutants in stormwater and other nonpoint-source runoff. Measures range from source control, such as reduced surface disturbance, to the treatment of polluted runoff, such as detention basins.

BMPs to be implemented as part of the *Storm Water Management Program* and Construction General Permit (and SWPPP) may include the following practices.

- Temporary erosion control measures (such as silt fences, staked straw bales/wattles, silt/sediment basins and traps, check dams, geofabric, sandbag dikes, and temporary revegetation or other ground cover) will be employed to control erosion from disturbed areas.
- Use a dry detention basin (which is typically dry except after a major rainstorm, when it will temporarily fill with stormwater), designed to decrease runoff during storm events, prevent flooding, and allow for off-peak discharge. Basin features will include maintenance schedules for the periodic removal of sediments, excessive vegetation, and debris that may clog basin inlets and outlets.
- Cover or apply nontoxic soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more) that could contribute sediment to waterways.
- Enclose and cover exposed stockpiles of dirt or other loose, granular construction materials that could contribute sediment to waterways.
- Ensure that no earth or organic material will be deposited or placed where it may be directly carried into a stream, marsh, slough, lagoon, or body of standing water.
- Prohibit the following types of materials from being rinsed or washed into the streets, shoulder areas, or gutters: concrete, solvents and adhesives, thinners, paints, fuels, sawdust, dirt, gasoline, asphalt and concrete saw slurry, and heavily chlorinated water.

- Ensure that grass or other vegetative cover will be established on the construction site as soon as possible after disturbance.

The contractor will select a combination of BMPs (consistent with the Construction General Permit) that is expected to minimize runoff and remove contaminants from stormwater discharges. The final selection of BMPs will be subject to approval by the San Francisco Bay Regional Water Board and the Central Valley Water Board.

The contractor will verify that a notice of intent has been filed with the State Water Board and that a SWPPP has been developed before allowing construction to begin. The contractor will perform inspections of the construction area, to verify that the BMPs specified in the SWPPP are properly implemented and maintained. The contractor will notify the appropriate Regional Water Board immediately if there is a noncompliance issue and will require compliance. If necessary, the contractor or their agent will require that additional BMPs be designed and implemented if those originally constructed do not achieve the identified performance standard.

Impact WQ-2: Substantial decrease of groundwater supplies or substantial interference with groundwater recharge such that the Project may impede sustainable groundwater management of the basin (less than significant)

Project construction would involve relatively small footprints, compared with the size of the entire groundwater basin, and, therefore, would not result in blocking groundwater infiltration or interfere with groundwater recharge. The proposed Project would require a minimal amount of water, which would be trucked to the site, on a temporary basis during construction and an even smaller amount of water during Project operation. Water for construction, used primarily for dust control, would be obtained from Zone 7 Water Agency, Byron-Bethany Irrigation District, the City of Livermore, or other approved water district or agency if available. Water for operations would be obtained from a groundwater source by installing an onsite well. The water supply assessment (Appendix D) concludes that there is an adequate water supply available to meet the needs of the proposed Project for both construction and operation activities, and would not decrease groundwater supplies. The Project would not substantially interference with groundwater recharge such that the Project would impede sustainable groundwater management of the basin. Therefore, this impact would be less than significant and no mitigation is required.

Impact WQ-3: Substantial alteration of existing drainage patterns in a manner that would result in substantial erosion or siltation onsite or offsite (less than significant with mitigation)

The Project would not substantially alter the existing drainage pattern in the area. Project drainage has been considered in the design. Culverts are generally installed as part of the road drainage system on slopes, although some are installed at small stream crossings. Existing culverts may need to be replaced with larger culverts or reinforced to provide adequate size and strength for construction vehicles.

Vegetation would be cleared and the staging areas would be level graded. If needed, native material, supplemented with gravel or soil stabilizer, would be placed in these areas, and appropriate erosion control devices (e.g., earth berm, silt fences, straw bales) would be installed to manage water runoff. Diversion ditches would be installed, as necessary, to prevent stormwater from running onto the site from surrounding areas. Following completion of construction activities, the contractor would restore the temporary staging areas. The gravel surface would be removed, and the areas would be contour graded (if necessary and if environmentally beneficial) to conform to the natural topography. Stockpiled topsoil would be replaced, and the area would be stabilized and reseeded with an appropriate seed mixture. Following construction, the Project would maintain pre-project sheet-flow drainage patterns (i.e., flow and rates).

BMPs would be implemented consistent with standard practice and with the requirements of the PEIR as well as any state or federal permits to minimize soil erosion, sedimentation of drainages downslope of the Project area, and any other environmental impacts. Examples of likely erosion control measures include:

- Use of straw wattles, silt fences/straw bale dikes, and straw bales to minimize erosion and collect sediment (to protect wildlife, no monofilament-covered sediment control measures would be used).
- Reseeding and restoration of the site.
- Maintenance of erosion control measures.
- Regular inspection and maintenance of erosion control measures.

In addition, no turbines would be constructed within existing drainage areas, and Project facilities would be designed to avoid any downstream erosion during the rainy season. Implementation of PEIR Mitigation Measure WQ-1 would ensure that Project-related stormwater runoff would not result in substantial erosion or downstream siltation. Further, the Project would be required to adhere to the NPDES Construction General Permit. Implementation of PEIR Mitigation Measure WQ-1 would reduce this impact to a less-than-significant level.

PEIR Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-4: Substantial increase in the amount of surface runoff in a manner that would result in flooding onsite or offsite (less than significant with mitigation)

Changes in impervious cover associated with Project construction would not cause a substantial increase in the amount of surface runoff that would result in flooding. New and expanded roads would be constructed to accommodate the new, larger turbines. However, new and expanded roads would be gravel, and would not introduce new impervious surfaces. Although this would result in an increase in the extent of graveled surfaces (which can result in increased runoff), the soils underlying the Project area are predominantly high runoff soils (i.e., Hydrologic Soil Group D) (United States Department of Agriculture 2019). Compacted gravel roads have runoff potential similar to that of Hydrologic Soil Group D soils. Consequently, the additional graveled roads would not result in a net increase in runoff potential compared with existing native soils where the new gravel would be placed. Because runoff would not increase as a result of additional gravel roads, there would not be an increase in flooding onsite or offsite. In addition, Project construction would be required to comply with the NPDES stormwater Construction General Permit, which requires that post-construction runoff management measures be implemented if the Project's SWPPP determines that a Project could cause an increase in peak runoff flows from the Project area. Implementation of PEIR Mitigation Measure WQ-1 would ensure that Project-related stormwater runoff would not result in flooding onsite or offsite. Implementation of PEIR Mitigation Measure WQ-1 would reduce this impact to a less-than-significant level.

PEIR Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-5: Creation of or contribution to runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff (less than significant with mitigation)

The Project area does not have any existing stormwater drainage facilities, and none are planned. Construction of the Project would not increase the rate of polluted runoff. However, construction could generate polluted runoff because soil would be stripped, bare areas exposed, and sedimentation from stormwater could result. Implementation of PEIR Mitigation Measure WQ-1 and BMPs provided in the SWPPP would ensure that Project-related stormwater runoff would not affect water quality and that there would be no increase in the rate of polluted runoff. Implementation of PEIR Mitigation Measure WQ-1 would reduce this impact to a less-than-significant level.

PEIR Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-6: Obstruction or redirection of flood flows caused by drainage modifications (no impact)

Because the Project area is not within a 100-year flood zone, the area is not subject to flood flows. In addition, the Project area includes existing infrastructure such roads, transmission lines, and turbines; Project construction would include new or upgraded roads, and new or replaced turbines. In the event of a flood, new features would not substantially obstruct or redirect flood flows, as similar features are already present on site. There would be no impact.

Impact WQ-7: In flood hazard, tsunami, or seiche zones, risk of release of pollutants as a result of Project inundation (less than significant with mitigation)

The Project is not near a large body of water capable of producing a seiche event, and is approximately 50 miles east of the Pacific Ocean and not subject to a tsunami event. If the Bethany Reservoir Dam were to fail, the likelihood of significant flood risk is considered minimal. Potential release of pollutants as a result of Project inundation could occur during construction involving sediment- or contaminated runoff from disturbed work areas or potential spills that could result in temporary impacts on water resources. However, BMPs such as runoff control measures, including stabilizing construction areas, and sediment controls and filtration, would be implemented to minimize impacts on water resources. Furthermore, the SWPPP, which includes provisions to reduce and control discharges other than stormwater, would be implemented.

Due to the minimal change in impervious area, there would be no substantial reduction of water infiltration into the ground, and risk of release of pollutants as a result of Project inundation would be minimal during Project operation. In addition, standard facilities used to handle stormwater would include diversion ditches used to prevent stormwater from running onto the site from surrounding areas, and would serve to manage, direct, and convey stormwater and flood water. Implementation of PEIR Mitigation Measure WQ-1 would ensure that Project-related stormwater runoff would be properly managed to reduce the risk of release of pollutants as a result of Project inundation. With implementation of PEIR Mitigation Measure WQ-1, the impact would be less than significant.

PEIR Mitigation Measure WQ-1: Comply with NPDES requirements

Impact WQ-8: Conflict with or obstruction of implementation of a water quality control plan or sustainable groundwater management plan (less than significant with mitigation)

The Project area is within the jurisdiction of the Central Valley Water Board, and subject to the boards' basin plan. The Project would include stormwater BMPs, as required by PEIR Mitigation Measure WQ-1, to protect water quality and beneficial uses, as defined in the basin plan. Implementation of the Project SWPPP would also regulate discharges to ensure compliance with the basin plan's water quality standards, and would not conflict with or obstruct implementation of a water quality control plan. Adequate water supply is available to meet the needs of the Project for both construction and operation activities, and would not decrease groundwater supplies. The Project would only minimally affect groundwater resources because excavation would be temporary and short-term during the construction period. Due to the minimal change in impervious area, there would be no substantial reduction or interference of water infiltration into the ground and associated groundwater recharge or depletion of groundwater supplies that would conflict with implementation of sustainable groundwater management would not occur. As a result, the Project would not conflict with or obstruct the implementation of a water quality control plan or sustainable groundwater management plan. With implementation of PEIR Mitigation Measure WQ-1, the impact would be less than significant.

PEIR Mitigation Measure WQ-1: Comply with NPDES requirements

3.10.3 References Cited

Printed References

Alameda County. 2000. *East County Area Plan*. Adopted May 1994. Modified by passage of Measure D, effective December 22, 2000. Oakland, CA

California Department of Water Resources. 2006. California's Groundwater Bulletin 118, San Joaquin Valley Groundwater Basin Tracy Subbasin. January 20. Accessed: February 7, 2019.

Central Valley Regional Water Quality Control Board. 2018. *The Water Quality Control Plan (Basin Plan) for the Central Valley Region*. May. Available: https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr_201805.pdf. Accessed: February 8, 2019.

State Water Resources Control Board. 2018. *2014/2016 Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report)*. Available: https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2014_2016.shtml. Accessed: February 7, 2019.

U.S. Department of Agriculture. 2019. Natural Resources Conservation Service Web Soil Survey. Available: https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx. Accessed. February 15, 2019.

3.11 Land Use and Planning

This section describes the regulatory and environmental setting for land use and planning in the Project area. It also describes impacts on land use and planning that could result from implementation of the Project.

3.11.1 Existing Conditions

Regulatory Setting

Federal

There are no federal regulations regarding land use and planning that apply to the Project.

State

All cities and counties are required by the state to adopt a general plan establishing goals and policies for long-term development, protection from environmental hazards, and conservation of identified natural resources (California Government Code 65300). California Government Code Section 65302 lists seven elements or chapters that cities and counties must include in their general plans: land use, circulation, housing, conservation, open space, noise, and safety.

Of the mandatory general plan elements, the land use element typically has the broadest scope. This central element describes the desired distribution, location, and extent of the jurisdiction's land uses, which may include housing; business; industry; open space, including agriculture, natural resources, recreation, and enjoyment of scenic beauty; education, and public buildings and grounds; and solid and liquid waste disposal facilities.

Local

As stated above, land use and planning are the province of local governments in California. General plans lay out the pattern of future residential, commercial, industrial, agricultural, open space, and recreational land uses within a community. To facilitate implementation of planned growth patterns, general plans typically also include goals and policies addressing the coordination of land use patterns with the development and maintenance of infrastructure facilities and utilities.

Local jurisdictions implement their general plans by adopting zoning, grading, and other ordinances. Zoning identifies the specific types of land uses that are allowed on a given site and establishes standards for new development.

Lands within the Project area are planned and managed according to the *Alameda County General Plan*, which is split into three area plans; the Project area falls within the area covered by the *East County Area Plan* (ECAP).

East County Area Plan

The ECAP guides the future development and resource conservation within unincorporated eastern Alameda County, which encompasses more than 400 square miles around the cities of Dublin, Livermore, and Pleasanton, and east of Hayward. This area extends from the Pleasanton/Dublin ridgeline on the west to the San Joaquin County line on the east and from the Contra Costa County line on the north to the Santa Clara County line on the south.

The ECAP contains goals, policies, and procedures regarding land use, including urban and rural development, sensitive lands and open space, public facilities, and special land uses (Alameda County 2000). Several of its land use policies and programs apply to the Project. Various ECAP policies specifically relating to selected environmental resources (e.g., aesthetics, hazards and hazardous materials, noise) are presented in the regulatory setting discussions of those resource sections.

Relevant general open space land use policies are listed below.

Policy 52: The County shall preserve open space areas for the protection of public health and safety, provision of recreational opportunities, production of natural resources (e.g., agriculture, windpower, and mineral extraction), protection of sensitive viewsheds (see definition in Table 1 [of East Area County Plan]), preservation of biological resources, and the physical separation between neighboring communities (see Figure 4 [of East Area County Plan]).

Policy 53: The County shall preserve a continuous band of open space consisting of a variety of plant communities and wildlife habitats to provide comprehensive, rather than piecemeal, habitat conservation for all of East County. This open space should, as much as possible, be outside of the Urban Growth Boundary and contiguous to large open space areas of Contra Costa, Santa Clara, and San Joaquin Counties.

Policy 70: The County shall work with the East Bay Regional Park District (EBRPD), the Livermore Area Recreation and Park District (LARPD), and other relevant agencies to ensure that open space trails adjacent to San Joaquin, Contra Costa, and Santa Clara Counties connect with trail systems in these other counties.

Relevant agriculture land use policies are listed below.

Policy 71: The County shall conserve prime soils (Class I and Class II, as defined by the USDA Soil Conservation Service Land Capability Classification) and Farmland of Statewide Importance and Unique Farmland (as defined by the California Department of Conservation Farmland Mapping and Monitoring Program) outside the Urban Growth Boundary.

Policy 89: The County shall retain rangeland in large, contiguous blocks of sufficient size to enable commercially viable grazing.

Policy 92: The County shall encourage the retention of existing large parcels of greater than 320 acres in remote areas designated "Large Parcel Agriculture" or "Resource Management," where the parcels are not well served by roads, infrastructure, and services.

Relevant windfarm land use policies are listed below.

Policy 169: The County shall allow for continued operation, new development, redevelopment, and expansion of existing and planned windfarm facilities within the limits of environmental constraints.

Policy 170: The County shall protect nearby existing uses from potential traffic, noise, dust, visual, and other impacts generated by the construction and operation of windfarm facilities.

Environmental Setting

The Project area is characterized by mostly treeless, rolling hills of annual grassland. Livermore, approximately 4 miles west of the Project area, is the nearest established community to the Project area.

Project area land consists of undeveloped grazing land. The Project area is zoned A (Agriculture), which is intended to promote implementation of general plan land use proposals (or designations) for agricultural and other nonurban uses.

Land use in the Project area is designated as Large Parcel Agriculture. Permitted uses include a variety of agricultural and agricultural support uses. Wind generation is a conditionally permitted use, and privately owned wind electric generators are present throughout and surrounding the Project area.

3.11.2 Environmental Impacts

This section describes the impact analysis relating to Project area land use. It describes the methods used to determine Project impacts and identifies the thresholds used to conclude whether an impact would be significant.

Methods for Analysis

Analysis of land use within the Project area involved review of the Alameda County Zoning Map, General Plan Land Designation Map, the PEIR, and other applicable land use plans to determine whether any land uses would be adversely affected. CEQA does not require an assessment of the degree to which a project conforms to land use policy or promotes general plan goals or objectives, with the exception of policies that have been adopted specifically to protect an environmental resource addressed by CEQA.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the proposed Project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Physical division of an established community.
- Conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.

Impacts and Mitigation Measures

Impact LU-1: Physical division of an established community (no impact)

No established communities are present within the Project area. The Project area is located in a rural region of Alameda County. The Project area and its vicinity are primarily used for cattle grazing and wind energy production, with scattered rural residences nearby. Accordingly, the Project would not divide an established community because none exists. There would be no impact and no mitigation is required.

Impact LU-2: Conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect (no impact)

The Project consists of the replacement and operation of wind turbines in on large parcels in eastern Alameda County. Land within and adjacent to the Project area is used for grazing, scattered rural residences, and other windfarms. Project area lands are under agricultural use with extensive windfarm operations. Wind turbines exist throughout the Project area and constitute a conditionally permitted use. The Project would not conflict with any applicable land use plan, policy, or regulation, including the *Alameda County General Plan*, the ECAP or the Alameda County Zoning Ordinance. Accordingly, Project implementation would not result in any changes to existing land uses or pose any land use conflicts. There would be no impact. No mitigation is required.

3.11.3 References Cited

Printed References

Alameda County. 2000. *East County Area Plan*. Adopted May 1994. Modified by passage of Measure D, effective December 22, 2000. Oakland, CA.

3.12 Noise

This section describes the environmental setting and regulatory setting for noise. It also describes the noise impacts, if any, that would result from implementation of the Project. Where applicable, mitigation measures are described that would reduce significant impacts.

3.12.1 Existing Conditions

Regulatory Setting

Federal, state, and local agencies regulate different aspects of environmental noise. Generally, the federal government sets noise standards for transportation-related noise sources closely linked to interstate commerce. These include aircraft, locomotives, and trucks. The state government sets noise standards for transportation noise sources such as automobiles, light trucks, and motorcycles. Noise sources associated with industrial, commercial, and construction activities are generally subject to local control through noise ordinances and general plan policies. Local general plans identify general principles intended to guide and influence development plans.

State

Part 2, Title 24 of the California Code of Regulations, *California Noise Insulation Standards*, establishes minimum noise insulation standards to protect persons within new hotels, motels, dormitories, long-term care facilities, apartment houses, and dwellings other than single-family residences. Under this regulation, interior noise levels attributable to exterior noise sources cannot exceed a day-night sound level (L_{dn}) of 45 decibels (dB) in any habitable room. Where such residences are located in an environment where exterior noise is 60 L_{dn} or greater, an acoustical analysis is required to ensure that interior levels do not exceed the 45 L_{dn} interior standard.

The *State of California General Plan Guidelines* (Governor's Office of Planning and Research 2017) identifies guidelines for the noise elements of local general plans, including a sound level/land use compatibility chart that categorizes, by land use, outdoor L_{dn} ranges in up to four categories: normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable. For many land uses, the chart shows overlapping L_{dn} ranges for two or more compatibility categories.

The noise element guideline chart identifies the normally acceptable range of L_{dn} values for low-density residential uses as less than 60 dB and the conditionally acceptable range as 55–70 dB. The normally acceptable range for high-density residential uses is identified as L_{dn} values of less than 65 dB, and the conditionally acceptable range is identified as 60–70 dB. For educational and medical facilities, L_{dn} values of less than 70 dB are considered normally acceptable, and L_{dn} values of 60–70 dB are considered conditionally acceptable. For office and commercial land uses, L_{dn} values of less than 70 dB are considered normally acceptable, and L_{dn} values of 67.5–77.5 are categorized as conditionally acceptable. When noise levels are in the conditionally acceptable range new construction should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation requirements are included in the design.

These overlapping L_{dn} ranges are intended to indicate that local conditions (existing sound levels and community attitudes toward dominant sound sources) should be considered in evaluating land use compatibility at specific locations.

Local

Alameda County General Plan Noise Element

The *Alameda County General Plan* Noise Element (Alameda County 1976) contains goals, objectives, and implementation programs for the entire county to provide its residents with an environment that is free from excessive noise and that promotes compatibility of land uses with respect to noise. The Noise Element does not explicitly define the acceptable outdoor noise level for the backyards of single-family homes or common outdoor spaces of multi-family housing projects, but it recognizes the U.S. Environmental Protection Agency noise level standards for residential land uses. These standards are an exterior L_{dn} of 55 A-weighted decibels (dBA) and an interior L_{dn} of 45 dBA. (The L_{dn} measurement, which also includes a 10 dB weighting for night-time sound, is approximately equal to the community noise equivalent level for most environmental settings.) The Noise Element also references noise and land use compatibility standards developed by an Association of Bay Area Governments-sponsored study.

East County Area Plan

Alameda County's East County Area Plan (Alameda County 2000) contains the following goal, policies, and implementation programs related to community noise and windfarms.

Goal: To minimize East County residents' and workers' exposure to excessive noise.

Policies

Policy 170: The County shall protect nearby existing uses from potential traffic, noise, dust, visual, and other impacts generated by the construction and operation of windfarm facilities.

Policy 288: The County shall endeavor to maintain acceptable noise levels throughout East County.

Policy 289: The County shall limit or appropriately mitigate new noise sensitive development in areas exposed to projected noise levels exceeding 60 dB based on the California Office of Noise Control Land Use Compatibility Guidelines.

Policy 290: The County shall require noise studies as part of development review for projects located in areas exposed to high noise levels and in areas adjacent to existing residential or other sensitive land uses. Where noise studies show that noise levels in areas of existing housing will exceed "normally acceptable" standards (as defined by the California Office of Noise Control Land Use Compatibility Guidelines), major development projects shall contribute their pro-rated share to the cost of noise mitigation measures such as those described in Program 104.

Implementation Programs

Program 74: The County shall amend the Zoning Ordinance to incorporate siting and design standards for wind turbines to mitigate biological, visual, noise, and other impacts generated by windfarm operations.

Program 104: The County shall require the use of noise reduction techniques (such as buffers, building design modifications, lot orientation, sound walls, earth berms, landscaping, building setbacks, and real estate disclosure notices) to mitigate noise impacts generated by transportation-related and stationary sources as specified in the California Office of Noise Control Land Use Compatibility Guidelines.

Noise Ordinance

Alameda County's noise ordinance (County General Code, Chapter 6.60) allows higher noise exposure levels for commercial properties than for residential uses, schools, hospitals, churches, or libraries. These standards augment the state-mandated requirements of the Alameda County Building Code, which establishes standards for interior noise levels consistent with the noise insulation standards in the California State Building Code. Table 3.12-1 shows the number of cumulative minutes that a particular external noise level is permitted, as well as the maximum noise allowed under the Alameda County General Code.

Table 3.12-1. Alameda County Exterior Noise Standards

Cumulative Number of Minutes in Any 1-Hour Time Period Daytime	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Residential uses, schools, hospitals, churches, and libraries		
30	50 dBA	45 dBA
15	55 dBA	50 dBA
5	60 dBA	55 dBA
1	65 dBA	60 dBA
Maximum	70 dBA	65 dBA
Commercial uses		
30	65 dBA	60 dBA
15	70 dBA	65 dBA
5	75 dBA	70 dBA
1	80 dBA	75 dBA
Maximum	85 dBA	80 dBA

Source: Alameda County General Code, Chapter 6.60.
dBA= A-weighted decibels.

The County Zoning Ordinance (County General Code, Chapter 17) restricts noise from commercial activities by prohibiting any use that would generate a noise or vibration that is discernible without instruments beyond the property line. This performance standard does not apply to transportation activities or temporary construction work.

The provisions of the ordinance do not apply to noise sources associated with construction, provided the activities do not take place before 7 a.m. or after 7 p.m. on any day except Saturday or Sunday, or before 8 a.m. or after 5 p.m. on Saturday or Sunday.

Conditional Use Permits

The PEIR refers to the County's conditional use permits (CUPs) for the operation of windfarms regulated by Resolution Number R-2005-463. The following specific condition regarding noise levels is stated:

> Noise Standards: Wind turbines shall be operated so as to not exceed the County's noise standard of 55 dBA (L_{dn}) or 70 dBC (L_{dn}) as measured in both cases at the exterior of any dwelling unit. If the dwelling unit is on land under lease from the Permittee, the applicable standard shall be 65 dBA (L_{dn}) and 70 dBC (L_{dn}).

The County has determined that use of a single 55 dBA standard will be sufficient to ensure that no 70 C-Weighted Decibel (dBC) threshold is exceeded. Research and analysis indicate that a low-frequency noise level of 70 dBC could not be reached unless the noise level were also well over the 55 dBA threshold.

The resolution approving the CUPs for windfarm operations included a finding that as a land use, the wind energy use "is properly related to other land uses and transportation and service facilities in the vicinity, in that… d) Although some residents may object to the visual, noise, or other effects of the turbines, the County has determined that the wind energy projects are in compliance with the conditions of approval and are an acceptable use in the area."

The PEIR identifies thresholds for assessing the significance of noise impacts from wind turbine operations. The PEIR states that a project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Exposure of residences to noise from new wind turbines in excess of 55 dBA (L_{dn}) where wind turbine noise is currently less than 55 dBA (L_{dn}). In the situation where the dwelling unit is on the same parcel being leased for windfarm, 65 dBA (L_{dn}) is used as the threshold.
- Exposure of residences to a daily noise increase in L_{dn} value of more than 5 dB from the addition of new wind turbines where the existing noise level is in excess of 55 dBA (L_{dn}). In the situation where the dwelling unit is on the same parcel being leased for windfarm, 65 dBA (L_{dn}) is used as the threshold.
- Exposure of residences to equipment noise associated with construction activities that exceed Alameda County noise ordinance standards during nonexempt hours (7 p.m. to 7 a.m. on weekdays and 5 p.m. to 8 a.m. on Saturday and Sunday).

The PEIR concluded that significant noise impacts could result during decommissioning of existing turbine, construction of new turbines, and operation of new wind turbines in the program area, and the PEIR identified mitigation measures to reduce these impacts to a less-than-significant level.

Environmental Setting

The Project area is located within the Alameda County portion of the program area. Land around the Project area is primarily rural and agricultural, with a low density of single-family residences. Traffic on local roads is the primary sound source in the area. The older existing turbines in the Project area have been either removed or are non-operational so they are no longer a source of sound in the area. Newer turbines installed on adjacent properties are a source of sound but are not a noticeable factor in the sound environment in the Project area.

Long-term noise monitoring was conducted for a period of two consecutive 24-hour days near residential uses on the site in January 2016 (ICF International 2016). Noise levels in public right-of-way were heavily influenced by traffic and had day-night noise level values of 66 to 78 dBA L_{dn}. Measured noise levels at a residential land use were in the range of 50 to 51 dBA L_{dn} (ICF 2018).

3.12.2 Environmental Impacts

Methods for Analysis

Construction

The assessment of potential construction noise levels was based on methodology developed by the Federal Transit Administration (Federal Transit Administration 2018). Potential effects associated with construction of the proposed Project would be temporary and intermittent. Typical noise levels produced by commonly used construction equipment are shown in Table 3.12-2. Individual types of construction equipment would generate maximum noise levels ranging from 74 to 85 dBA at a distance of 50 feet. The construction noise level at a given receiver location depends on the type of construction activity and the distance and shielding between the activity and noise-sensitive receivers.

Maximum sound levels at 50 feet are shown in Table 3.12-2 along with the typical acoustical use factors. The acoustical use factor is the percentage of time each piece of construction equipment is assumed to be operating at full power (i.e., its noisiest condition) during construction operation and is used to estimate equivalent sound level (L_{eq}) values from maximum sound level (L_{max}) values. For example, the L_{eq} value for a piece of equipment that operates at full power 50% of the time (acoustical use factor of 50) is 3 dB less than the L_{max} value.

Table 3.12-2. Commonly Used Construction Equipment Noise Emission Levels

Equipment Type	Typical Maximum Noise Level at 50 Feet from Source (dBA)	Acoustical Use Factor (%)	One-hour Equivalent Noise Level at 50 Feet from Source (dBA)
Cement truck	79	40	75
Compactor	83	20	76
Crane	81	16	73
Dozer	82	40	78
Dump truck	76	40	72
Excavator	81	40	77
Flat-bed truck	74	40	70
Front-end loader	79	40	75
Grader	85	40	81
Horizontal directional drilling bore machine	82	25	76
Rock crusher	85	50	82
Trencher	80	50	77
Water truck	76	40	72

Source: Federal Highway Administration 2006.
dBA = A-weighted decibels.

Construction would primarily involve the use of cranes, graders, and trucks. High-impact equipment types such as impact-hammer pile drivers are not expected to be used during construction of the Project. To characterize the source level of the worst-case noise condition during a given phase of construction, the two loudest pieces of equipment were assumed to operate simultaneously at a construction site perimeter location, at a receiver distance of 50 feet.

The Federal Transit Administration has developed suggested noise limits for construction noise. For residences, a construction noise impact is considered to occur if equipment noise levels exceed 80 dBA L_{eq} (8-hour) during daytime hours (7:00 a.m. to 10:00 p.m.)

Wind Turbines

Noise levels from wind turbines were modeled using the SoundPlan 7.4 acoustical modeling software, which implements ISO Standard 9613-2: Acoustics—Attenuation of Sound during Propagation Outdoors—Part 2 General Method of Calculation for Propagation Modelling. The standard is designed to calculate sound pressure levels under "average" meteorological conditions that are favorable to propagation. The standard applies downwind and temperature inversion conditions to predict reasonable worst-case sound levels.

Each of the three alternative layouts would involve the operation of 40 turbines. A hub height of 80 meters was assumed for all turbines. The layout for each option consists of 5 of the model GE 2.3-116 turbines and 35 of the model GE-3.8-137 turbines. Sound power levels in terms of octave band levels and the overall A-weighted level for each of the two turbines was modeled based on turbine specifications, assuming a hub height wind speed of 10 meters per second or more. The cumulative sound level from simultaneous operation of all turbines under reasonable worst-case sound propagation conditions at nearby residences was used as the model case for each layout. Modeling assumed 24-hour operation of the turbines. The ground type was modeled as a hard surface (zero value) to apply a worst-case ground attenuation factor. No other attenuation factors or safety factors were applied.

The County uses a noise standard for wind turbines in the program area of 55 dBA (L_{dn}) or 70 dBC (L_{dn}) at dwelling units, with the exception that dwelling units on the same parcel being leased for windfarm use may be exposed to up to 65 dBA (L_{dn}). Noise impacts associated with the Project were evaluated based on how the Project would change the daily noise level as a result of wind turbine operations. The threshold of 5 dB is used because it is generally considered to be the lowest sound level change clearly noticeable by the human ear.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the proposed Project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Generation of increased ambient noise levels in the Project vicinity in excess of standards established in a local general plan or noise ordinance or applicable standards of other agencies.
- Generation of excessive groundborne vibration or groundborne noise levels.
- Placement of Project-related activities in the vicinity of a private airstrip or an airport land use plan, or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, resulting in exposure of people residing or working in the Project area to excessive noise levels.

Impacts and Mitigation Measures

Impact NOI-1: Generation of increased ambient noise levels in the Project vicinity in excess of applicable standards (less than significant with mitigation)

Construction

Construction of the wind turbine facilities, access roads, and associated facilities would generally involve the construction phases and equipment shown in Table 3.12-3.

Table 3.12-3. Construction Phases and Equipment

Construction Phase	Equipment
1—Decommissioning and foundation removal	Crane, truck and lowboy trailer, excavator, grader, dump truck
2—Laydown areas, substations and switch yards construction	Road grader, track type dozer, drum type compactor, water truck, truck and lowboy trailer, backhoe/front loader
3—Road construction	Road grader, track type dozer, drum type compactor, water truck, truck and lowboy trailer, backhoe/front loader, excavator, rock crusher
4—Wind turbine generator foundations and batch plant	Road grader, track type dozer, drum type compactor, water truck, truck and lowboy trailer, backhoe/front loader, excavator, rock crusher, cement truck
5—Wind turbine generator delivery and installation	Crane, truck and lowboy trailer, excavator
6—Utility collector line installation	Water truck, backhoe/front loader, trencher, horizontal directional drilling bore machine
7—Cleanup and restoration	Road grader, excavator

Table 3.12-4 summarizes the combined noise level of equipment associated with each construction phase.

Table 3.12-4. Combined Noise Level by Construction Phase

Construction Phase	L_{max} Noise Level at 50 Feet from Source (dBA)	L_{eq} Noise Level at 50 Feet from Source (dBA)
1—Decommissioning and foundation removal	88	83
2—Laydown areas, substations and switch yards construction	89	85
3—Road construction	91	87
4—Wind turbine generator foundations and batch plant	95	86
5—Wind turbine generator delivery and installation	84	79
6—Utility collector line installation	86	81
7—Cleanup and restoration	86	82

dBA = A-weighted decibels; L_{eq} = equivalent sound level; L_{max} = maximum sound level.

Based on geometric attenuation of 6 dB per doubling of distance and additional attenuation resulting from ground absorption and atmospheric effects, potential construction noise levels at various distances for each construction phase have been calculated relative to the Alameda County noise ordinance standards. Table 3.12-5 summarizes the results of this analysis and identifies distances within which Alameda County noise standards could be exceeded as a result of construction activities.

Table 3.12-5. Construction Noise Analysis

	Daytime Hours (7 a.m. to 10 p.m.)		Nighttime Hours (10 p.m. to 7 a.m.)	
Construction Phase	Distance (feet) to 70 dBA L_{max}	Distance (feet) to 50 dBA L_{eq}	Distance (feet) to 65 dBA L_{max}	Distance (feet) to 45 dBA L_{eq}
1—Decommissioning and foundation removal	235	820	345	1,105
2—Laydown areas, substations and switch yards construction	260	910	385	1,225
3—Road construction	290	1,130	460	1,520
4—Wind turbine generator foundations and batch plant	435	1,035	625	1,390
5—Wind turbine generator delivery and installation	170	545	270	865
6—Utility collector line installation	190	675	285	1,075
7—Cleanup and restoration	205	750	300	1,190

dBA = A-weighted decibels; L_{eq} = equivalent sound level; L_{max} = maximum sound level.

The results in Table 3.12-5 indicate that construction activities may potentially result in noise levels that exceed Alameda County noise ordinance standards during nonexempt hours. Therefore, the exposure of residences to construction equipment noise is considered to be a significant impact.

Implementation of the noise-reducing measures listed below in PEIR Mitigation Measure NOI-2, *Employ noise-reducing practices during decommissioning and new turbine construction*, would reduce noise so that it does not exceed Alameda County noise ordinance standards, and therefore would reduce this impact to a less-than-significant level.

PEIR Mitigation Measure NOI-2: Employ noise-reducing practices during decommissioning and new turbine construction

Project applicants will employ noise-reducing construction practices so that construction noise does not exceed Alameda County noise ordinance standards. Measures to limit noise may include the following:

- Prohibit noise-generating activities before 7 a.m. and after 7 p.m. on any day except Saturday or Sunday, and before 8 a.m. and after 5 p.m. on Saturday or Sunday.

- Locate equipment as far as practical from noise sensitive uses.
- Require that all construction equipment powered by gasoline or diesel engines have sound-control devices that are at least as effective as those originally provided by the manufacturer and that all equipment be operated and maintained to minimize noise generation.
- Use noise-reducing enclosures around noise-generating equipment where practicable.
- Implement other measures with demonstrated practicability in reducing equipment noise upon prior approval by the County.

In no case will the applicant be allowed to use gasoline or diesel engines without muffled exhausts.

Operation

Modeled sound levels at sensitive receptor locations under each of the three alternative turbine layouts are described in the *Sound Technical Report* in terms of L_{eq} and L_{dn} using A-weighting (ICF 2018). A total of 76 receptor locations representing single-family residences in the Project area were evaluated in the model and assessed for noise impacts based on the County standard. The analysis concluded that wind turbine noise levels would exceed the County 55 L_{dn} noise standard at a total two residential receptors. Wind turbine noise modeling results for these two receptors are summarized in Table 3.12-6.

Table 3.12-6. Summary of Wind Turbine Sound Modeling Results

	Turbine Layout 1		Turbine Layout 2		Turbine Layout 3	
Receptor	L_{dn} (dBA)	Exceedance of 55 L_{dn}	L_{dn} (dBA)	Exceedance of 55 L_{dn}	L_{dn} (dBA)	Exceedance of 55 L_{dn}
R1	58.3	3.3	58.2	3.2	58.2	3.2
R3	55.0	0.0	55.0	0.0	55.1	0.1

Source: ICF 2018.
dBA = A-weighted decibels; L_{dn} = day-night sound level.

The impact of sound levels from wind turbines exceeding local standards would be significant. Implementation of PEIR Mitigation Measure NOI-1, *Perform project-specific noise studies*, would reduce this impact to a less-than-significant level.

PEIR Mitigation Measure NOI-1: Perform project-specific noise studies and implement measures to comply with County noise standards

The applicant for any proposed repowering project will retain a qualified acoustic consultant to prepare a report that evaluates noise impacts associated with operation of the proposed wind turbines. This evaluation will include a noise monitoring survey to quantify existing noise conditions at noise sensitive receptors located within 2,000 feet of any proposed turbine location. This survey will include measurement of the daily A-weighted L_{dn} values over a 1-week period and concurrent logging of wind speeds at the nearest meteorological station. The study will include a site-specific evaluation of predicted operational noise levels at nearby noise sensitive uses. If operation of the project is predicted to result in noise in excess of 55 dBA (L_{dn}) where noise is currently less than 55 dBA (L_{dn}) or result in a 5 dB increase where noise is currently greater than 55 dBA(L_{dn}), the applicant will modify the project, including selecting new specific installation sites within the program area, to ensure that these performance standards will not be exceeded.

Methods that can be used to ensure compliance with these performance standards include but not limited to increasing the distance between proposed turbines and noise sensitive uses and the use of alternative turbine operational modes to reduce noise. Upon completion of the evaluation, the project applicant will submit a report to the County demonstrating how the project will comply with these performance standards. After review and approval of the report by County staff, the applicant will incorporate measures as necessary into the project to ensure compliance with these performance standards.

Impact NOI-2: Generation of excessive groundborne vibration or groundborne noise levels (less than significant)

Construction of access roads, turbines, and associated facilities would involve the use of heavy equipment that may produce vibration that would be perceptible up to a distance of 50 feet away from the vibration source. No impact equipment such as pile drivers is expected to be used during construction. Rubber-tired vehicles such as heavy trucks are not a significant source of vibration. Consequently, proposed construction activities are not expected to result in perceptible levels of vibration in sensitive buildings. This impact is considered less than significant. No mitigation is required.

Impact NOI-3: Placement of Project-related activities in the vicinity of a private airstrip or an airport land use plan or within 2 miles of a public airport or public use airport, resulting in exposure of people residing or working in the Project area to excessive noise levels (no impact)

The nearest airstrip is Byron Airport, a general aviation airport located about 3 miles north of the Project area. There would be no impact. No mitigation is required.

3.12.3 References Cited

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3.13 Population and Housing

This section describes the regulatory and environmental setting for population and housing in the Altamont Pass Wind Resource Area (APWRA) and the Project area. It also describes impacts related to population and housing that could result from implementation of the Project.

3.13.1 Existing Conditions

Regulatory Setting

Federal

There are no relevant federal regulations for population and housing.

State

There are no relevant state regulations for population and housing other than the California Department of Housing and Community Development's (HCD) Regional Housing Needs Assessment, which is discussed below.

Local

Association of Bay Area Governments Regional Housing Need Allocation

The Regional Housing Need Assessment (RHNA) process addresses the need for housing across a range of incomes and in all communities throughout the state. To ensure that adequate housing is available for all income groups, HCD is responsible for determining this regional need in coordination with the Association of Bay Area Governments (ABAG). ABAG is required to distribute the region's share of statewide need to the cities and counties within its jurisdiction.

The purpose of the RHNA is to allocate to cities and counties their *fair share* of the Bay Area's projected housing need by household income groups, which are categorized as very low, low, moderate, and above moderate. The RHNA allocates 1,769 units to unincorporated Alameda County (Association of Bay Area Governments 2013). Alameda County is required to adopt a housing element in compliance with this allocation.

East County Area Plan

The *East County Area Plan* (ECAP) contains goals and policies related to population and housing (Alameda County 2000). Polices related to population and housing are listed below. For additional analysis of program consistency with ECAP goals and policies, refer to Section 3.11, *Land Use and Planning*.

> **Policy 14:** The County shall promote an approximate balance between jobs and housing within East County and shall further promote a range of housing types reflecting the income distribution of the local employment base.
>
> **Policy 15:** The County shall evaluate all proposed major projects for their effect on the East County jobs/housing ratio and the provision of housing affordable to East County workers as well as the potential impacts on adjacent counties, especially in terms of in-commuting. To the extent feasible,

the County shall impose measures on projects in the unincorporated County to reduce potential impacts arising from inadequate provision of housing, and shall encourage the cities to do the same.

Environmental Setting

Population

The population of Alameda County in 2010 was 1,510,271 (Association of Bay Area Governments 2010). During the 20-year period from 1990 to 2010, Alameda County's population increased by approximately 18%. During the 20-year period from 2010 to 2030, the population in unincorporated Alameda County is expected to increase by 17.2% to 171,500, with an average growth rate of 4.0% every 5 years. Table 3.13-1 presents the anticipated growth for both the unincorporated county and the county as a whole.

Table 3.13-1. Unincorporated Alameda County and Countywide Population Growth Projections 2010–2030

Year	Unincorporated Alameda County Population	Percent Change		Alameda County Population	Percent Change	
		Incremental	Cumulative		Incremental	Cumulative
2010	146,300	–	–	1,510,271[a]	–	–
2015	151,700	3.7	3.7	1,626,100	7.7	7.7
2020	158,700	4.6	8.5	1,705,900	4.9	13.0
2025	164,900	3.9	12.7	1,787,300	4.8	18.3
2030	171,500	4.0	17.2	1,874,600	4.9	24.1
2035						

Source: Association of Bay Area Governments 2009.
[a] Data for 2010 Alameda County is from the 2010 U.S. Census (Association of Bay Area Governments 2010).

Housing

Housing Units

In 2010, there were 50,022 housing units in unincorporated Alameda County (Table 3.13-2). This is an increase of 1,430 from 2000. Approximately 95.1% of the housing units were occupied in 2010, compared with 97.9% in 2000. In Alameda County as a whole, there were 540,183 housing units in 2000 and 582,549 housing units in 2010. Approximately 96.9% percent of the housings units were occupied in 2000 and 93.6% were occupied in 2010.

Table 3.13-2. Unincorporated Alameda County and Countywide Housing Units 2000, 2010

	2000	2010
Unincorporated Alameda County		
Total housing units	49,595	50,022
Change in housing units	–	+1,430
Occupied housing units	48,529	48,516
Change in occupied housing units		-13
Percent occupied	97.9	95.1
Alameda County		
Total housing units	540,183	582,549
Change in housing units	–	+42,366
Occupied housing units	523,366	545,138
Change in occupied housing units	–	+21,772
Percent occupied	96.9	93.6

Source: Association of Bay Area Governments 2010.

Households

There are some scattered rural-residential areas and agricultural housing areas located within the PEIR program area. Between 2000 and 2010, the number of households in the county and in the Bay Area[1] increased by approximately 4.1% and 5.8%, respectively. As shown in Table 3.13-3, ABAG projects that the number of households in unincorporated Alameda County will increase by approximately 17.8% by 2030, with an average increase of approximately 4.2% every 5 years.

Table 3.13-3. Unincorporated Alameda County and Countywide Household Growth Projections 2010–2030

Year	Unincorporated Alameda County Households	Percent Change		Alameda County Households	Percent Change	
		Incremental	Cumulative		Incremental	Cumulative
2010	51,700			545,138[a]	–	–
2015	53,910	4.3	4.3	585,400	7.4	7.4
2020	56,310	4.5	8.9	615,470	5.1	12.9
2025	58,620	4.1	13.4	645,680	4.9	18.4
2030	60,910	3.9	17.8	676,280	4.7	24.1

Source: Association of Bay Area Governments 2009.
[a] Data for 2010 is from the 2010 U.S. Census (Association of Bay Area Governments 2010).

[1] The Bay Area consists of nine counties: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma.

Employment

ABAG estimates that Alameda County will experience an approximately 36% increase in jobs, from 712,850 jobs in 2010 to 970,490 jobs in 2030. Table 3.13-4 summarizes the projected 5-year incremental increases in jobs in the county as a whole from 2010 to 2030.

Table 3.13-4. Alameda County Jobs and Employed Resident Projections

	2010	2015	2020	2025	2030
Total jobs	712,850	761,270	825,070	897,810	970,490
Employed residents	725,200	778,900	868,800	950,800	1,025,100
Jobs per employed resident	0.98	0.98	0.95	0.94	0.95

Source: Association of Bay Area Governments 2009.

Since 2010, Alameda County has had more employed residents than jobs (Table 3.13-4), which means that workers are commuting out of Alameda County. This trend is expected to continue through 2030. By 2020, Alameda County is projected to have 825,070 jobs and 868,800 employed residents, a ratio of 0.95 jobs for every employed resident (Association of Bay Area Governments 2009).

In 2010, there were approximately 54,000 construction jobs in Alameda County. This was an increase of approximately 2,200 from 2000 (Association of Bay Area Governments 2009). The State of California estimates there will be 2,520 new jobs for construction workers in Alameda and Contra Costa Counties during the 2010–2020 time period (California Employment Development Department 2010). Although updated projections for Alameda County are not available, the Oakland-Hayward-Berkeley area estimates that from 2014 to 2024, there will be a large increase in construction jobs, from 17,200 to 75,800, or 2,940% (California Employment Development Department 2019).

In 2010, there were approximately 85,900 unemployed persons in Alameda County, an unemployment rate of approximately 11.3%. By 2019, the unemployment rate had fallen to approximately 3.1% (California Employment Development Department 2019).

3.13.2 Environmental Impacts

This section presents the impact analysis relating to Project effects related to population and housing. It describes the methods used to determine the impacts of the Project and lists the thresholds used to conclude whether an impact would be significant.

Methods for Analysis

Identifying the proposed Project's impacts on population and housing involves a review of program information presented in the PEIR, Project information, ABAG's *Projections 2009*, and the ECAP.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the proposed Project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Creation of substantial unplanned population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure).
- Displacement of a substantial number of existing people or housing, necessitating the construction of replacement housing elsewhere.

Impacts and Mitigation Measures

Impact POP-1: Creation of substantial population growth either directly or indirectly (no impact)

The Project would not create any housing and would, therefore, not result in a direct increase in population. Indirect population growth is discussed below.

Construction

Project construction would take between 6 and 9 months. Construction would result in a temporary increase in construction-related job opportunities in the local area. However, the new jobs provided by construction of the Project would be temporary and, therefore, would not likely result in household relocation by construction workers to the Project area.

Construction workers can be expected to be drawn from the construction employment labor force already residing in the region. These jobs would not be permanent and are not expected to change the 2020 ratio of 0.95 jobs per employed resident. Therefore, employment opportunities provided by construction of the Project would not generate population growth. There would be no impact. No mitigation is required.

Operation and Maintenance

Operation and maintenance of the Project would be similar to operation and maintenance of existing wind farms in the APWRA. Activities would be conducted year-round, with operation, monitoring, and control of wind turbines performed continuously. Operation and maintenance would require full-time, skilled workers. It is expected that these workers would be sourced from the existing pool of personnel that is employed for operation and maintenance of the existing windfarms. Therefore, operation and maintenance of the Project would not create new jobs and would not induce population growth or an increased demand for housing.

Project implementation would result in the widening of existing service roads and the construction of new service roads and electrical infrastructure. The service roads would provide access to various Project facilities within the Project area, including wind turbines and substations. The purpose of the new electrical infrastructure would be to transfer power generated by the turbines to the regional electrical grid. The roads and electrical infrastructure would be privately owned and would neither extend offsite nor provide convenient connection points for potential offsite development. Therefore, any new infrastructure within the Project area would not encourage new development or induce population growth.

The Project would allow for generation of electricity for distribution to the electrical grid. The generation of wind energy is necessary to meet the legal requirement for investor-owned utilities, electric service providers, and community choice aggregators to meet state RPS requirements. The

Project would repower the legacy turbines with current-generation turbines. There would be no impact. No mitigation is required.

Impact POP-2: Displacement of a substantial number of existing people or housing, necessitating the construction of replacement housing elsewhere (no impact)

The majority of the Project area is currently developed as a windfarm and the remainder of the Project area is used for cattle grazing. Because no housing exists within the Project area, the Project would not include the demolition or displacement of any existing housing. Because there would be no demolition of any housing, the Project would not displace any people. There would be no impact. No mitigation is required.

3.13.3 References Cited

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3.14 Public Services

This section describes the regulatory and environmental setting for public services. It also describes the impacts on public services that would result from implementation of the Project.

3.14.1 Existing Conditions

Regulatory Setting

Federal

There are no relevant federal regulations for public facilities and services.

State

There are no relevant state regulations for public facilities and services.

Local

Alameda County

East County Area Plan

The Public Services and Facilities Element, and the Environmental Health and Safety Element of the *East County Area Plan* (ECAP) contain goals, policies, and programs related to fire protection and police services. The following goals and policies are applicable to the proposed Project (Alameda County 2000).

Goal: To ensure the prompt and efficient provision of police, fire, and emergency medical facility and service needs.

Policy 241: The County shall provide effective law enforcement, fire, and emergency medical services to unincorporated areas.

Policy 242: The County shall reserve adequate sites for sheriff, fire, and emergency medical facilities in unincorporated locations within East County.

Goal: To minimize the risk to lives and property due to fire hazards.

Policy 324: The County shall require the use of fire resistant building materials, fire-resistant landscaping, and adequate clearance around structures in "high" and "very high" fire hazard areas.

Environmental Setting

Fire Protection

The Alameda County Fire Department provides fire protection services to the Project area in coordination with the California Department of Forestry and Fire Protection (CalFire). CalFire has responsibility for fire protection and suppression activities within State-designated high fire hazard severity zones known as State Responsibility Areas. The Project area lies within areas mapped as "Moderate" and "High" Fire Hazard Severity Zones by CalFire (California Department of Forestry and

Fire Protection 2007). The nearest CalFire facility is Station 26 (Castle Rock) at 16502 Schulte Road in Tracy. CalFire responded to approximately eight fires in 2011 and four fires in 2012 related to wind turbines in the portion of the Altamont Pass within Alameda County (Giambrone pers. comm.). Although the Altamont Pass Wind Resource Area is under CalFire jurisdiction, the Alameda County Fire Department (ACFD) would also respond to any wildland fire in the Project area. Stations 20 and 8 are the two ACFD stations closest to the Project area. Station 20 is located at the Lawrence Livermore Laboratory at 7000 East Avenue in Livermore, approximately 5.5 miles from the Project area's southwest boundary. Additional information on fire protection in the Project area is in Section 3.19 *Wildfire*.

Law Enforcement

The Alameda County Sheriff's Office provides law enforcement services to unincorporated areas of Alameda County. The station with responsibility for the Project area is the Tri-Valley Sub Station at 5320 Broder Boulevard in Dublin. Theft is the most common crime in the Altamont pass area, the theft of copper related to wind turbines and tools that are stored and used to repair wind turbines in particular.

Schools

The Project area is in the Livermore Valley Joint Unified School District. However, no school facilities are located within the Project area. The nearest school to the Project area is Mountain House Elementary (3950 Mountain House Road, Byron), approximately 0.67 miles east of the Project Area. Mountain House Elementary is in Mountain House Elementary School District. Bethany Elementary School (570 South Escuela Drive, Mountain House) is approximately 1.5 miles east of the Project area. Bethany Elementary is in Lammersville Union School District.

Parks

Alameda County contains numerous recreational facilities, including regional preserves, parks, and other open space areas. Several such areas provide recreational opportunities near the Project area. Park and recreational facilities are discussed in Section 3.15, *Recreation*.

Libraries

The Project area is in the Alameda County Libraries system, which has 10 locations throughout the County. There are no libraries in the Project area. The nearest public library is the Livermore Public Library in the city of Livermore at 998 Bluebell Drive.

3.14.2 Environmental Impacts

This section describes the impact analysis relating to public services for the Project. It describes the methods used to determine the impacts of the Project and lists the thresholds used to conclude whether an impact would be significant.

Methods for Analysis

Identifying the Project's impacts on public services involved a review of the *Alameda County General Plan*, ECAP and the CalFire Hazard Severity Zone Map, as well as contacting local fire department and law enforcement officials to discuss the existing conditions and potential effects of the proposed Project. Because no other public facilities (e.g., libraries) exist in the Project area, they are not discussed below.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the proposed Project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or creation of a need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:
    - Fire protection
    - Police protection
    - Schools
    - Parks
    - Other public facilities

Impacts and Mitigation Measures

Impact PS-1: Creation of a need for new or physically altered governmental facilities to maintain acceptable service ratios, response times, or other performance objectives for fire protection, police protection, schools, parks, of other public facilities (no impact)

Fire Protection

CalFire provides fire protection services to the Project area. The fire protection facilities and infrastructure required to protect the proposed facilities and employees are already in place and would not change as a result of the Project. The newer generation of wind turbines is generally safer than the original models that exist in the area, resulting in fewer ignition risks (Giambrone pers. comm.). All of the workers that would be employed during construction and operations are expected to reside locally or regionally and, therefore, are a part of the existing demand on fire protection services. The Project would not result in the need for new or altered fire protection facilities, such as a new or expanded fire station. There would be no impact. No mitigation is required. See Section 3.19, *Wildfire*, for a discussion of wildland fire impacts and fire prevention requirements.

Law Enforcement

The Alameda County Sherriff's Office provides law enforcement services to the Project area. The Project would be located entirely on properties with restricted public access. The site is fenced and the collector substations would be fenced with an additional 12-foot-high chain-link fence to prevent public access to high-voltage equipment. Only authorized access to the Project site would be allowed. During construction, onsite mobile trailers would be located within the staging areas to support workforce needs and site security. Vegetation clearance would be maintained adjacent to the Project area ingress and egress points, and around the collector substations, transformers, and interconnection riser poles to deter unauthorized access to these areas.

The construction and operation workers are anticipated to be from the local and regional workforce, and, therefore, are already part of the existing demand on police services. Thus, the Project would not require additional police staffing or facilities. There would be no impact. No mitigation is required.

Schools

No residential uses are proposed as part of the proposed Project, which would not result in new, permanent jobs that would bring new residents to the area. Therefore, no new students would be generated. Temporary and permanent employees are assumed to reside locally and regionally and their school-aged children are assumed to be part of the existing or anticipated student population. Therefore, implementation of the Project would not require the construction or expansion of school facilities. There would be no impact. No mitigation is required.

Parks

There are several regional parks and other open space areas within the vicinity of the Project. These facilities are intended to serve a large segment of the regional population. Residential uses are not proposed as part of the Project, which would not result in new, permanent jobs that would bring new residents to the area; thus, no direct increase in the number of park users is expected to result from the Project. It is anticipated that temporary and permanent employees would already reside locally and regionally, and so would be part of the existing demand on park facilities. There would be no impact. No mitigation is required. Parks are discussed in more detail in Chapter 3.15, *Recreation*.

3.14.3 References Cited

Printed References

Alameda County. 2000. *East County Area Plan*. Adopted May 1994. Modified by passage of Measure D, effective December 22, 2000. Oakland, CA.

California Department of Forestry and Fire Protection. 2007. *Adopted Fire Hazard Severity Zone Maps for State Responsibility Areas.* November 7.

Personal Communications

Giambrone, Bryan. Fire Captain at Morgan Hill Headquarters, Santa Clara Unit. CalFire, California. July 2, 2013—telephone conversation with Lindsay Christensen, ICF International.

Kelly, Ray. Police Sergeant at Tri-Valley Substation. Alameda County Sheriff's Office, California. July 2, 2013—telephone conversation with Lindsay Christensen, ICF International.

3.15 Recreation

This section describes the regulatory and environmental setting for recreation resources in the APWRA and the Project area. It also describes impacts on these resources that could result from implementation of the Project.

3.15.1 Existing Conditions

Regulatory Setting

Federal

There are no relevant federal regulations for recreation.

State

There are no relevant state regulations for recreation.

Local

Alameda County

Countywide Recreation Plan

The Recreation Plan, an element of the *Alameda County General Plan*, was adopted in June 1956 and last amended in May 1994. The Recreation Plan provides a guide for private and public acquisition and development of recreation areas and facilities. It contains general planning objectives related to promotion and preservation of recreational opportunities throughout the county.

East County Area Plan

The Public Services and Facilities Element of the *East County Area Plan* contains goals, policies, and programs to ensure the development of local and regional parks throughout the East County Area. The Land Use Element contains various goals, policies and programs regarding Sensitive Lands and Regionally Significant Open Space that apply to recreation that include the following (Alameda County 2000:18, 20).

Goal: To protect regionally significant open space and agricultural land from development.

Policy 52: The County shall preserve open space areas for the protection of public health and safety, provision of recreational opportunities, production of natural resources (e.g., agriculture, windpower, and mineral extraction), protection of sensitive viewsheds, preservation of biological resources, and the physical separation between neighboring communities.

Policy 54: The County shall approve only open space, park, recreational, agricultural, limited infrastructure, public facilities (e.g., limited infrastructure, hospitals, research facilities, landfill sites, jails, etc.) and other similar and compatible uses outside the Urban Growth Boundary.

Policy 70: The County shall work with the East Bay Regional Park District (EBRPD), the Livermore Area Recreation and Park District (LARPD), and other relevant agencies to ensure that open space trails adjacent to San Joaquin, Contra Costa, and Santa Clara Counties connect with trail systems in these other counties.

East Bay Regional Park District Master Plan

The *East Bay Regional Park District Master Plan* (Master Plan) is a policy document that guides the East Bay Regional Park District (EBRPD) in future expansion of parks, trails, and services for its regional parks in Contra Costa and Alameda Counties (East Bay Regional Park District 2013). The Master Plan includes policies for conserving natural and cultural resources; providing for recreational opportunities; and providing for the balanced distribution, acquisition, protection, restoration, management, and development of the regional parks. The 2013 Master Plan Map identifies the current system of regional parks, open spaces, and trails.

Environmental Setting

Alameda County contains numerous recreational facilities, including major parks and open space areas, local parks, and private recreational facilities. Several such areas provide recreational opportunities within and in the vicinity of the program area. The Project area is characterized by rolling hills, few trees, and grazing land. Parks and trails are shown on Figure 3.1-2.

Regional Trails

The EBRPD Master Plan Map identifies several regional trails within the program area (East Bay Regional Park District 2013).

- Brushy Peak to Del Vale.
- San Joaquin to Shadow Cliffs.
- Brushy Peak to Bethany Reservoir.
- Vasco Caves to Brushy Peak.

The California Aqueduct Bikeway runs through the Project area, parallel to the California Aqueduct. It follows Interstate 580 and Interstate 5 near Tracy to the San Louis Reservoir State Recreation Area. This paved trail is maintained by the state and allowed uses include bicycling and pedestrian use (National Recreation Trail 2019).

Regional Preserves and Recreation Areas

Regional preserves and recreational areas are shown in Figure 3.1-2. Bethany Reservoir and the Bethany Reservoir State Recreation Area are located adjacent to the Project area. The reservoir is a place for water-oriented recreation such as wind surfing and fishing, and also contains a bike trail along the California Aqueduct Bikeway (California Department of Parks and Recreation 2019). It is considered a potential Regional Recreation Area (East Bay Regional Park District 2013).

3.15.2 Environmental Impacts

Methods for Analysis

Identifying the proposed Project's impact on recreational resources involved a review of the *East County Area Plan* policies, the EBRPD Master Plan, and the PEIR.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the proposed Project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Increased use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.
- Construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

Impacts and Mitigation Measures

Impact REC-1: Increased use of existing recreational facilities, resulting in substantial physical deterioration (no impact)

There are no existing neighborhood parks on or in the vicinity of the Project area. Existing regional parks and other recreational facilities near the Project area would not be affected because the Project would not introduce new potential users of parks or other recreational facilities. Construction workers are presumed to reside locally or regionally and, therefore, would be among the existing users of available facilities. The operations and maintenance workforce at the site would be the same for the Project as for the existing wind energy operations. No additional permanent employees would be required. The Project is not anticipated to increase the use of existing parks or other recreational facilities such that substantial physical deterioration would result or be accelerated. There would be no impact. No mitigation is required.

Impact REC-2: Construction or expansion of recreational facilities that might have an adverse physical effect on the environment (no impact)

The Project would not include recreational facilities. It would not require the construction of new or expansion of existing recreational facilities because the Project would not generate a significant number of new users of such facilities, as discussed under Impact REC-1. Construction workers are presumed to reside locally or regionally and, therefore, would be among the existing users of area recreational facilities. Operation and maintenance activities would be similar to existing activity. Because the Project would not result in an increased demand for recreational facilities, no new recreational facilities would need to be developed or provided that could have a physical effect on the environment. There would be no impact. No mitigation is required.

3.15.3 References Cited

Printed References

Alameda County. 2000. *East County Area Plan*. Adopted May 1994. Modified by passage of Measure D, effective December 22, 2000. Oakland, CA.

California Department of Parks and Recreation. 2019. *Bethany Reservoir SRA*. Available: http://www.parks.ca.gov/?page_id=562. Accessed: April 24, 2019.

East Bay Regional Park District. 2013. *East Bay Regional Park District Master Plan*. Available: http://www.ebparks.org/planning/mp. Accessed: June 26, 2013; August 9, 2013.

National Recreation Trail. 2019. *California Aqueduct Bikeway*. Available: http://www.nrtdatabase.org/trailDetail.php?recordID=85. Accessed: April 24, 2019.

3.16 Transportation

The PEIR evaluated traffic impacts for a generic 80 MW project and for two specific projects in the program area. No Project-specific traffic analysis is necessary for the Sand Hill Project because the impacts identified as potentially significant in the PEIR (e.g., increased traffic congestion and traffic hazards) would also apply to the Project, and the mitigation measures set forth in the PEIR would adequately address those impacts.

3.16.1 Existing Conditions

Regulatory Setting

Federal and State

The California Department of Transportation (Caltrans) is responsible for operating and maintaining all state-owned roadways and interstate highways in California. The California Vehicle Code Division 15 gives Caltrans discretionary authority to issue special permits for the movement of vehicles and loads exceeding statutory size and weight limitations. A special permit issued by Caltrans is required to authorize the operation of oversize or overweight trucks, both of which would be required for implementation of the Project.

Local

Alameda County

Alameda County's *East County Area Plan* (ECAP) (Alameda County 2000) contains goals and policies to maintain an efficient circulation network in the eastern portion of the county. Among the ECAP's goals are creating and maintaining a balanced multimodal transportation system, cooperating with other regional transportation planning agencies, integrating pedestrian use into the transportation system, and mitigating exceedances of level of service (LOS) standards. According to Policy 193, the traffic LOS standard for major intercity arterials is LOS D. The Alameda County Transportation Commission (CTC), Alameda County's Congestion Management Agency (CMA), has adopted LOS E for Congestion Management Program (CMP) and Metropolitan Transportation System (MTS) roadway segments (e.g. Interstate [I-] 580, I-680, and State Route 84).

LOS standards and travel demand measures, established by the Alameda CTC, are intended to regulate long-term traffic impacts associated with future development, and do not apply to temporary construction activities whose short-term traffic increases end when construction concludes.

Alameda County has neither designated local truck routes nor adopted specific policies regarding management of construction activities. Chapter 12.08 of the Alameda County Code regulates roadway use, including issuance of encroachment permits for work within an Alameda County road right-of-way.

Alameda County General Plan

The Alameda County General Plan consists of three area plans that contain the Land Use and Circulation Elements for their respective geographic areas, as well as area-specific goals, policies and implementation actions for circulation, open space, conservation, safety, and noise. In addition, the General Plan contains Housing, Conservation, Open Space, Noise, Seismic and Safety, and Scenic Route Elements that contain goals, policies, and implementation actions that apply to the entire unincorporated area (Alameda County 2018). Other than the Scenic Route goals and policies that are discussed in Section 3.1, *Aesthetics*, there are no countywide circulation policies related to the Project. Countywide transportation plans, such as the Countywide Transportation Plan, and policies are primarily developed and maintained by the Alameda CTC, which serves as Alameda County's CMA.

Alameda County East County Area Plan

The ECAP contains transportation and traffic goals and policies applicable to the Project. (Alameda County 2000:43, 50–56). Goals in the ECAP are intended to be general statements of a condition Alameda County wants to achieve, and the associated policies are the focused statements of how Alameda County will achieve these goals. The goals and policies listed below are considered relevant to the Project.

Land Use—Windfarms

Goal: To maximize the production of wind generated energy.

Policy 170: The County shall protect nearby existing uses from potential traffic, noise, dust, visual, and other impacts generated by the construction and operation of windfarm facilities.

Transportation Systems—General Transportation

Goal: To create and maintain a balanced, multi-modal transportation system that provides for the efficient and safe movement of people, goods, and services.

***Policy 179:** The County shall adhere to provisions of the Regional Transportation Plan, Countywide Transportation Plan, and County Congestion Management Program, insofar as they are not inconsistent with the Initiative.

Transportation Systems—Transportation Demand Management

Goal: To reduce East County traffic congestion.

Policy 183: The County shall seek to minimize traffic congestion levels throughout the East County street and highway system.

Policy 184: The County shall seek to minimize the total number of Average Daily Traffic (ADT) trips throughout East County.

Policy 185: The County shall seek to minimize peak hour trips by exploring new methods that would discourage peak hour commuting and single vehicle occupancy trips.

Policy 187: The County shall monitor traffic levels according to East County Area Plan and Congestion Management Program objectives.

Policy 188: The County shall promote the use of transit, ridesharing, bicycling, and walking, through land use planning as well as transportation funding decisions.

Policy 190: The County shall require new non-residential developments in unincorporated areas to incorporate Transportation Demand Management (TDM) measures and shall require new residential developments to include site plan features that reduce traffic trips such as mixed use development and transit-oriented development projects.

Policy 191: The County shall work with cities and the Congestion Management Agency to coordinate land use impact analyses.

Transportation Systems—Streets and Highways

Goal: To complete County-planned street and highway improvements that are attractively designed to integrate pedestrian and vehicle use.

Policy 192: The County shall work with Caltrans to improve the interstate and state highway systems and the County road system according to the street classifications shown on the East County Area Plan Transportation Diagram (see Figure 6), consistent with Policy 177.

Policy 193: The County shall ensure that new development pays for roadway improvements necessary to mitigate the exceedance of traffic Level of Service standards (as described below) caused directly by the development. The County shall further ensure that new development is phased to coincide with roadway improvements so that (1) traffic volumes on intercity arterials significantly affected by the project do not exceed Level of Service D on major arterial segments within unincorporated areas, and (2) that traffic volumes on Congestion Management Program (CMP) designated roadways (e.g., Interstate Highways 580 and 680 and State Highway 84) significantly affected by the project do not exceed Level of Service E within unincorporated areas. If LOS E is exceeded, Deficiency Plans for affected roadways shall be prepared in conjunction with the Congestion Management Agency. LOS shall be determined according to Congestion Management Agency adopted methodology. The County shall encourage cities to ensure that these Levels of Service standards are also met within unincorporated areas.

Transportation Systems—Bicycle and Pedestrian Paths

Goal: To include a comprehensive network of bicycle and pedestrian paths in the local and subregional transportation network.

Policy 211: The County shall create and maintain a safe, convenient, and effective bicycle system that maximizes bicycle use.

Policy 214: The County shall require that circulation and site plans for individual developments minimize barriers to access by pedestrians, the disabled, and bicycles (e.g., collectors or arterials separating schools or parks from residential neighborhoods).

Transportation Systems—Aviation

Goal: To ensure the efficient, safe, and economically beneficial operation of the Livermore Municipal Airport.

Policy 217: The County shall require that, where conflicts between a new use and the airport that could interfere with the airport's operations are anticipated, the burden of mitigating the conflicts will be the responsibility of the new use.

Alameda County Congestion Management Program

The Alameda County CMP identifies countywide strategies for managing transportation needs and procedures to reduce congestion. The CMP identifies existing and desired traffic conditions on roadways throughout Alameda County. One CMP-designated roads, Altamont Pass Road, runs through the Project area. Other CMP-designated roads in the vicinity of the Project area are Grant Line Road, North Front Road, Vasco Road, and I-580 between I-680 and I-205 (Alameda County Transportation Commission 2017: Chapter 2). A 2018 LOS monitoring study revealed that segments of I-580 in the Project vicinity operated at LOS F, which is worse than the CMP-designed LOS of E, during peak hours: westbound segment from the San Joaquin County line to Grant Line Road during the a.m. peak hour, and eastbound segment from 1st Street in Livermore to North Flynn Road in the unincorporated county during the p.m. peak hour. In addition, northbound North Vasco Road from Scenic Drive to Dalton Avenue in Livermore operated at LOS F during the p.m. peak hour. Eastbound Altamont Pass Road through the Project area operated at LOS C in during the p.m. peak hour and at LOS A during the a.m. peak hour (Alameda County Transportation Commission 2018: Appendix B).

Alameda Countywide Transportation Plan

The Alameda Countywide Transportation Plan is a long-range policy document that guides transportation funding decisions for Alameda County's transportation system through 2040. The plan lays out a strategy for meeting transportation needs for all users in Alameda County. The plan identifies projects and other improvements to new and existing freeways, local streets and roads, public transit (paratransit, buses, rails, ferries), and facilities and programs to support bicycling and walking (Alameda County Transportation Commission 2016). The plan sets the following goals for Alameda County's transportation system.

- Accessible, affordable and equitable for people of all ages, incomes, abilities and geographies.
- Integrated with land use patterns and local decision-making.
- Connected across the county, within and across the network of streets, highways and transit, bicycle and pedestrian routes.
- Multimodal.
- Cost effective.
- Safe.
- Reliable and efficient.
- Well maintained.
- Supportive of a healthy and clean environment.

These goals are aligned with one or more performance categories and performance measurements. The plan also identifies land use and conservation development strategies.

Alameda County Bicycle and Pedestrian Master Plan for Unincorporated Areas

The Bicycle and Pedestrian Master Plan describes existing conditions for bicycling and walking, identifies capital and program improvements to support these modes, and recommends projects to enhance bicycling and walking in the unincorporated areas (Alameda County 2012). The plan identifies high-priority projects that meet the short-term community needs, as well as strategies for education, funding, and implementation of the recommended projects and programs. This plan provides a vision for bicycling and walking in Alameda County as important alternative transportation modes. The plan also identifies implementable projects that will contribute to a more bicycle and pedestrian-friendly environment in the unincorporated areas.

The Bicycle and Pedestrian Master Plan contains goals and policies for developing and implementing a bikeway system and pedestrian improvements that meet Alameda County's vision for safe, attractive, and convenient opportunities for bicycling and walking for all types of trips and user groups.

> **Goal 1:** Improve bicycle and pedestrian access and circulation for all users as a means to meet the goals of the Alameda County Unincorporated Areas Climate Action Plan.

Goal 2: Create and maintain a comprehensive system of bicycle and pedestrian facilities in the local and sub-regional transportation network in order to establish a balanced multi-modal transportation system.

Policy 2.8: Routinely maintain bicycle and pedestrian facilities and amenities.

Goal 3: Maximize the use of public and private resources for implementing bicycle and pedestrian improvements.

Goal 4: Provide a safer bicycling and walking environment

Policy 4.1: Monitor bicycle and pedestrian-involved collisions in the Unincorporated Areas and target the high incidence locations for bicycle and pedestrian improvements.

Policy 4.4: Work with law enforcement officials on education and enforcement programs that increase safety awareness of all road users for bicyclists and pedestrians and that reduce bicycle and pedestrian-involved collisions.

Goal 5: Promote land uses and urban design that support a pleasant environment for bicycling and walking.

Policy 5.2: Design new development and redevelopment projects to facilitate bicycle and pedestrian access, reduce bicycling and walking trip lengths, and avoid adverse impacts to the bicycle and pedestrian safety, access, and circulation.

Policy 5.3: Consider options for commercial and industrial development projects to include bicycle storage facilities for employees and customers, shower/locker areas, and other facilities identified in this plan for employees that commute by bicycle. This could include on-site facilities or services available through local partnerships. Encourage including bicycle parking and shower/locker areas in new construction or major remodel projects.

Policy 5.7: Require that all traffic impact studies and analyses of proposed street changes address impacts on bicycling and pedestrian transportation. Specifically, the following should be considered:

- Consistency with General Plan and the Bicycle and Pedestrian Master Plan policies;
- Impact on the existing and future Bicycle and Pedestrian Master Plan Bikeway System;
- Permanent travel pattern or access changes including the degree to which bicycle and pedestrian travel patterns are altered or restricted due to any change to the roadway network; and
- Conformity to accepted bicycle and pedestrian facility design standards and guidelines.

Goal 6: Support agency coordination for the improvement of bicycle and pedestrian access.

San Joaquin County

San Joaquin County General Plan

The *San Joaquin County General Plan* consists of Community Development, Public Facilities and Services, Public Health and Safety, and Resources Elements. These elements provide goals and policies for land use, development, preservation, and resource conservation in the unincorporated areas (San Joaquin County 2016). The only general plan transportation goal relevant to the Project is Goal TM-3: To maintain a safe, efficient, and cost-effective roadway system for the movement of people and goods. The general plan designates Mountain House Parkway, Grant Line Road, and Byron Road as principal arterials.

Three specific plans, which are intended to carry out the policies and standards in the Mountain House Master Plan, have been adopted for the 4,784-acre Mountain House community, located east of the Project area. The master plan and specific plans set an LOS of D on Mountain House Parkway, Grant Line Road, and Byron Road (San Joaquin County 2005: 9-6).

San Joaquin County Regional Congestion Management Program

The San Joaquin Council of Governments serves as San Joaquin County's CMA. It updates on a biannual basis the Regional Congestion Management Program (RCMP), which is intended "to ensure that new land uses are developed in tandem with the necessary transportation improvements by coordinating the land use, air quality, and transportation planning processes" (San Joaquin Council of Governments 2018: 1). The RCMP roadway network consists of all state highways in addition to local arterials of regional significance. I-205, I-580, Mountain House Parkway, and Byron Road are RCMP-designated roadways near the Project area. The adopted LOS standard for the RCMP is D, although a lower LOS is allowed to account for circumstances such as interregional traffic, road construction activity, freeway ramp monitoring, and high-density or mixed-use development (San Joaquin County of Governments 2018: 28). The RCMP also designates a regional bikeway network; however, no portion of the network is near the Project area.

As of 2016, I-205 at the Alameda and San Joaquin County line operated at LOS F in the eastbound direction during the p.m. peak hour, and at LOS F in the westbound direction during the a.m. peak hour. I-580 in San Joaquin County operated at LOS A to D, depending on segment and time of day. No information is available in the most recent monitoring report for Mountain House Parkway or Byron Road because those roads were not added to the RCMP-designated network until 2016 (San Joaquin Council of Governments 2017).

Environmental Setting

Roadway Network

The road network and other existing conditions pertaining to traffic and transportation was described in the PEIR for the entire program area, of which the Project area is a subset. Most of the Project area would be accessed using roads as described in the PEIR (e.g., I-580, Altamont Pass Road), but some of the turbine locations on the east side of Bethany Reservoir and the California Aqueduct would be accessed from Mountain House Road, which was not specifically addressed in the PEIR.

Highways and county roadways provide access to the Project area. Regional access is provided by I-580, a major east-west truck travel route and main throughway in eastern Alameda County that connects I-680 on the west and I-5 on the east (see Figure 1-1). The 2016 annual average daily traffic (AADT) volume on I-580 near the Project area was about 155,000 vehicles per day. Trucks accounted for 10.4% to 12.5% of the vehicles traffic (California Department of Transportation 2016). Table 3.~~15~~16-1 provides Caltrans AADT volumes and data for composition of trucks on highways near the Project area.

Table 3.~~17~~16-1. Annual Average Daily Traffic Volumes on Regional Access Highways

Roadway	Segment Location	2016 AADT	2016 Truck AADT/ Percent of Total AADT
I-580, near Project area	I-205—Greenville Road, Livermore	155,000—156,000	19,375—16,224/ 12.5%—10.4%
I-580, west of Project area	Greenville Road, Livermore—I-680	156,000—230,000	12,996—15,573/ 8.3%—6.8%
I-580, east of Project area	I-5—I-205	21,000—40,600	3,381—5,699/ 16.1%—14.0%
I-205, Tracy	I-580—Junction I-5	123,000—97,000	14,760—11,087/ 12.0%—11.4%
I-680, Dublin	SR 84 East, Pleasanton—Alcosta Boulevard, San Ramon	120,000—173,000	11,040—9,194/ 9.2%—5.3%

Source: California Department of Transportation 2016.
AADT = Annual Average Daily Traffic.

Altamont Pass Road, Grant Line Road, and Mountain House Road are major county roads that provide access to the Project area. Many county roads in the vicinity have insufficient road base to support heavy, frequent truck loads (Alameda County Transportation Commission 2013b). Table 3.~~15~~16-2 provides average daily traffic volumes for Altamont Pass Road.

Table 3.~~17~~16-2. Average Daily Traffic Volumes on Altamont Pass Road

Roadway	Counter Location	Count Date	Direction	Average Daily Traffic Volume
Altamont Pass Road	West of Greenville Road	September 2011	Westbound	5,050
			Eastbound	5,200
			Total	10,250
	West of Grant Line Road	September 2011	Westbound	3,550
			Eastbound	2,300
			Total	5,850

Source: Alameda County Transportation Commission 2013.

Public Transit

There is no public transit service provided in the Project area. To the west and south of the Project area, Livermore Amador Valley Transit Authority provides the closest bus service. East of the Project area, San Joaquin Regional Transit District provides bus service in Mountain House and Tracy. The Altamont Corridor Express train is a commuter train service managed by the San Joaquin Regional Rail Commission for travel between Stockton and San Jose. The passenger train uses the Union Pacific Railroad tracks through the Project area, with grade-separated crossings of I-580 and Altamont Pass Road.

Bicycle and Pedestrian Circulation

Bicycle facilities in the cities and communities of Alameda and San Joaquin Counties are classified into three categories: Class I (bike paths) are described as completely separated, off-street, paved right-of-way (shared with pedestrians) paths, which exclude motor vehicle traffic; Class II (bike lanes) are striped lanes for one-way bike travel on a roadway; and Class III (bike routes) are on-street bike routes with signage but no striping. The Alameda County Bicycle Master Plan uses these or similar categories to describe the bikeway network in the unincorporated areas of Alameda County (Alameda County 2012). The San Joaquin County RCMP also uses this terminology (San Joaquin Council of Governments 2018: 19)

The only existing designated bikeways near the Project area are the recreational path along the California Aqueduct, and a short piece of Class III bike route in the developed portion of Mountain House. The Alameda County Bicycle Master Plan recommends bikeway route additions to the existing bikeway network by designation of a new Class IIIC rural bike route on Altamont Pass Road (Alameda County Public Works Agency 2012:3-18, Table 3-10, and 3-25, Figure3-3e) and the East Bay Regional Parks District (EBRPD) Master Plan identifies potential recreation trails just to the north and west the Project area that could become part of a larger regional network (East Bay Regional Parks District 2013).

Planned bicycle routes in the area would typically not serve a conventional bicycle commuter function, but primarily are intended as recreational and inter-regional access routes. Notably, the area is host to several annual spring, summer and fall bicycle touring, racing and charity events that utilize these rural bike routes.

County roads near the Project area generally lack sidewalks, crosswalks, and other pedestrian facilities.

Air Traffic

There are four airports in the vicinity of the Project area: Byron Airport is located about 2 miles north of the project area; Tracy Municipal Airport is located about 6.5 miles southeast of the project area; Meadowlark Field is located about 8.5 miles southwest of the project area; and Livermore Municipal Airport is located about 11 miles west of the project area.

3.16.2 Environmental Impacts

This section describes the transportation impact analysis for the Project. The section describes the methods used to determine the impacts of the Project, lists the thresholds used to conclude whether an impact would be significant, and identifies impacts that would result from Project implementation. The section also specifies measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts.

Methods for Analysis

The PEIR evaluated traffic impacts for a generic 80 MW project, as well as for two specific projects in the program area. No Project-specific traffic analysis is necessary for the Sand Hill Project because the impacts identified as potentially significant in the PEIR (e.g., increased traffic congestion and traffic hazards) would also result from the Project, and the mitigation measures set forth in the PEIR would adequately address those impacts.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the proposed project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Conflict with a program, plan, ordinance, or policy addressing the circulation system including transit, roadway, bicycle, and pedestrian facilities.
- Conflict or be inconsistent with State CEQA Guidelines Section 15064.3, subdivision (b).
- Substantial increase in hazards because of a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
- Potential to cause inadequate emergency access.

Impacts and Mitigation Measures

Impact TRA-1: Conflict with a program, plan, ordinance, or policy addressing the circulation system including transit, roadway, bicycle, and pedestrian facilities (less than significant with mitigation)

The PEIR concluded that construction activities could cause a substantial traffic increase on local county roads that provide direct access to Project construction sites, because these roads generally have low traffic volumes. However, these increases, although they could degrade traffic operations, would be of temporary duration. Implementation of PEIR Mitigation Measure TRA-1, *Develop and implement a construction traffic control plan*, would reduce potential construction-related traffic congestion or circulation issues, and therefore would reduce this impact to a less-than-significant level.

In addition, the PEIR concluded that no public transit services, or pedestrian or bicycle facilities are present on the Project access routes in the program area. However, oversized construction vehicles could potentially disrupt the movement of bicycles traveling on the shoulders of some local access roads (e.g., Altamont Pass Road, West Grant Line Road, Mountain House Road), and lane or road closures associated with material deliveries could temporarily disrupt bicycle access.

Implementation of PEIR Mitigation Measure TRA-1b would reduce potential conflicts between oversized and/or delivery vehicles and bicycles, and therefore would reduce this impact to a less-than-significant level.

PEIR Mitigation Measure TRA-1: Develop and implement a construction traffic control plan

Prior to starting construction-related activities, the Applicant shall prepare and implement a Traffic Control Plan (TCP) that will reduce or eliminate impacts associated with the proposed Project. The TCP shall adhere to Alameda County, San Joaquin County, and Caltrans requirements, and must be submitted for review and approval of the County Public Works Department prior to implementation. The TCP shall include the following elements. The County and Caltrans may require additional elements to be identified during their review and approval of the TCP.

- Schedule construction hours to minimize concentrations of construction workers commuting to/from the project site during typical peak commute hours (7 a.m. to 9 a.m. and 4 p.m. to 6 p.m.).
- Limit truck access to the project site during typical peak commute hours (7 a.m. to 9 a.m. and 4 p.m. to 6 p.m.).
- Require that written notification be provided to contractors regarding appropriate haul routes to and from the Project area, as well as the weight and speed limits on local county roads used to access the Project area.
- Provide access for emergency vehicles to and through the Project area at all times.
- When lane/road closures occur during delivery of oversized loads, provide advance notice to local fire, police, and emergency service providers to ensure that alternative evacuation and emergency routes are designated to maintain service response times.
- Provide adequate onsite parking for construction trucks and worker vehicles.
- Require suitable public safety measures in the Project area and at the entrance roads, including fences, barriers, lights, flagging, guards, and signs, to give adequate warning to the public of the construction and of any dangerous conditions that could be encountered as a result thereof.
- Complete road repairs on local public roads as needed during construction to prevent excessive deterioration. This work may include construction of temporary roadway shoulders to support any necessary detour lanes.
- Repair or restore the road right-of-way to its original condition or better upon completion of the work.
- Coordinate Project-related construction activities, including schedule, truck traffic, haul routes, and the delivery of oversized or overweight materials, with Alameda County, Caltrans, and affected cities and counties to identify and minimize overlap with other area construction projects.

Impact TRA-2: Conflict or be inconsistent with State CEQA Guidelines Section 15064.3, subdivision (b) (no impact)

Section 15064.3 subdivision (b) was added to the State CEQA Guidelines in 2018. It concerns analysis of project impacts based on potential increases in vehicle miles traveled. However, because the section is not applicable statewide until July 1, 2020, and environmental analysis of this project began in 2018, no analysis of vehicle miles traveled has been prepared for the Project. Because this section of the State CEQA Guidelines is not applicable, there would be no impact.

Impact TRA-3: Substantial increase in hazards because of a geometric design feature (e.g., sharp curves, dangerous intersections) or incompatible uses (e.g., farm equipment) (less than significant with mitigation)

The PEIR concluded that the presence of large, slow-moving construction and delivery vehicles could increase traffic safety hazards. Additionally, some of these vehicles could exceed roadway load and size limits. Permits from Caltrans District 4 and other relevant jurisdictions would be required for such vehicles. Compliance with permit requirements and implementation of PEIR Mitigation

Measure TRA-1 would reduce potential conflicts between roadway users and construction equipment and vehicles this impact to a less-than-significant level.

PEIR Mitigation Measure TRA-1: Develop and implement a construction traffic control plan

Impact TRA-4: Potential to cause inadequate emergency access (less than significant with mitigation)

Large, slow-moving construction and delivery vehicles and temporary road and lane closures could delay or obstruct the movement of emergency vehicles, as disclosed in the PEIR. Implementation of PEIR Mitigation Measure TRA-1 would reduce this impact to a less-than-significant level.

PEIR Mitigation Measure TRA-1: Develop and implement a construction traffic control plan

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3.17 Tribal Cultural Resources

This section describes the regulatory and environmental setting for tribal cultural resources. It also describes the impacts on tribal cultural resources that would result from implementation of the Project.

3.17.1 Existing Conditions

Regulatory Setting

Assembly Bill 52

Assembly Bill (AB) 52 (Chapter 532, Statutes of 2014) establishes a formal consultation process for California Native American tribes as part of CEQA and equates significant impacts on tribal cultural resources with significant environmental impacts (Public Resources Code [PRC] Section 21084.2). PRC Section 21074 defines *tribal cultural resources* as follows:

- Sites, features, places, sacred places, and objects with cultural value to descendant communities or cultural landscapes defined in size and scope that are either:
  - Included in or eligible for listing in the California Register of Historical Resources (CRHR).
  - Included in a local register of historical resources.
- A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC Section 5024.1.

Sacred places can include Native American sanctified cemeteries, places of worship, religious or ceremonial sites, and sacred shrines. In addition, both unique and non-unique archaeological resources, as defined in PRC Section 21083.2, can be tribal cultural resources if they meet the criteria detailed above. The lead agency relies upon substantial evidence to make the determination that a resource qualifies as a tribal cultural resource when it is not already listed in the CRHR or a local register.

AB 52 defines a *California Native American Tribe* as a Native American tribe located in California that is on the contact list maintained by the Native American Heritage Commission (PRC 21073). Under AB 52, formal consultation with tribes is required prior to determining the level of environmental document if a tribe has requested to be informed by the lead agency of proposed projects and if the tribe, upon receiving notice of the project, accepts the opportunity to consult within 30 days of receipt of the notice. AB 52 also requires that consultation, if initiated, address project alternatives and mitigation measures for significant effects, if specifically requested by the tribe. AB 52 states that consultation is considered concluded when either the parties agree to measures to mitigate or avoid a significant effect on tribal cultural resources, or when either the tribe or the agency concludes that mutual agreement cannot be reached after making a reasonable, good-faith effort. Under AB 52, any mitigation measures recommended by the agency or agreed upon with the tribe may be included in the final environmental document and in the adopted mitigation monitoring program if they were determined to avoid or lessen a significant impact on a tribal cultural resource. If the recommended measures are not included in the final environmental document, then the lead agency must consider the four mitigation methods described in PRC Section 21084.3 (PRC Section

21082.3[e]). Any information submitted by a tribe during the consultation process is considered confidential and is not subject to public review or disclosure. It will be published in a confidential appendix to the environmental document unless the tribe consents to disclosure of all or some of the information to the public.

Consultation requirements under AB 52 only apply to projects with notices of preparation (NOPs) issued after July 1, 2015. Because the NOP for this EIS/EIR was issued after July 1, 2015, consultation requirements under AB 52 apply to this EIS/EIR.

Environmental Setting

Ethnographic Period

The Project area is located on the eastern boundary of the Ohlone traditional land and the western edge of the Northern Valley Yokuts traditional area. Both are briefly described below.

Ohlone (Costanoan)

The territory of the Ohlone people extended along the coast from the Golden Gate in the north to just below Carmel to the south, and as far as 60 miles inland. The territory encompassed a lengthy coastline, as well as several inland valleys (Levy 1978:485–486). The Ohlone were hunter-gatherers and relied heavily on acorns, supplementing their diet with a range of other foodstuffs, such as various seeds (the growth of which was promoted by controlled burning), buckeye, berries, roots, mammals, waterfowl, reptiles, and insects (Levy 1978:491–493). Prior to contact, the Ohlone were politically organized by tribelet, with each having a designated territory. A tribelet was an organizational unit consisting of one or more villages with individuals generally numbering 100 to 250 members (Kroeber 1962). Ohlone villages typically had four types of structures: domed dwellings, sweathouses, oval or round dance structures, and a domed assembly house (Crespi 1927:219; Levy 1978:492).

Northern Valley Yokuts

Yokuts is a term applied to a large and diverse number of people inhabiting the San Joaquin Valley and Sierra Nevada foothills of central California. The Northern Valley Yokuts are the historical occupants of the central and northern San Joaquin Valley (Wallace 1978:462). Northern Valley Yokut villages tended to congregate around water sources, and relied heavily on fishing (in particular, salmon fishing). They varied their diet with waterfowl and the harvesting of wild plant food, such as acorns, seeds, and tule root (Wallace 1978:464). Most settlements, or at least the principal ones, were built atop low mounds on or near the banks of large watercourses for protection against spring flooding (Schenck 1926:132; Schenck and Dawson 1929:308; Cook 1960:242, 259, 285). Village populations averaged around 300 people, and villages contained oval or round family houses, a community lodge for dances, and a sweathouse (Wallace 1978:465).

Historic Period

The Project area is located in the hills adjacent to the Altamont Pass, between the cities of Livermore (to the west, in Alameda County) and Tracy (to the east, in San Joaquin County). Accordingly, the historic cultural setting of the Project is associated with the development of those two areas. Throughout the historic period, the development of infrastructure and evolution of the agrarian economy, have been most influential in guiding settlement and land use in this area.

Early Settlement of Livermore Valley and San Joaquin Valley (1769–1850s)

As early as 1769, the Spanish explorer José Francisco Ortega led an expedition through present-day Alameda County. Seven years later, Juan Bautista de Anza and Pedro Font traveled through the region. By 1797, Spain established the Misión del Gloriosísimo Patriarca Señor San José, currently referred to as Mission San Jose, 15 miles northeast of the present-day City of San Jose and approximately 20 miles southwest of the Project area (Kyle et al., 2002).

Under the direction of Father Fermín Lasuen, Mission San Jose prospered as an agricultural center, grazing sheep and cattle on the land now known as Livermore Valley (Kyle et. al. 2002). However, the mission's success came with a heavy cost to the Ohlone population who inhabited the territory. Many Ohlone were forced to live and work at the mission. Introduced disease, harsh living conditions, and reduced birth rates during this period resulted in a population decline. While the Ohlone number around 10,000 when the mission was established, their population diminished to less than 2,000 by 1832 (Cook 1943a, 1943b).

After the missions were secularized by the Mexican government (around 1830), many Native Americans, including Ohlones, left the missions in an attempt to reestablish their previous lives. Many Ohlone found work as wage laborers on the ranchos and mines or in domestic positions. There was a partial return to aboriginal religious practices and subsistence strategies, but for the most part, the Ohlone culture was greatly diminished (Levy 1978:486–487). Today, descendants of the Ohlone still live in the area, and many are active in maintaining their traditions and advocating Native American issues.

3.17.2 Environmental Impacts

This section describes the potential impacts of the proposed Project on tribal cultural resources and describes the methods used to evaluate the impacts and the thresholds used to determine whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts are provided, where feasible and appropriate.

Methods for Analysis

Cultural resources studies for the Project were carried out exclusively by ICF cultural resources staff in 2018. The studies were presented in two documents, one addressing the majority of the current Project area (ICF 2018a) and an addendum addressing an electrical line reroute located outside of the previously identified Project area (ICF 2018b). As part of those efforts, archaeological surveys and outreach efforts to the Native American Heritage Commission (NAHC) were carried out to identify archaeological resources or Sacred Sites that may be considered tribal cultural resources to consulting tribes. As a result of the cultural resource studies, no archaeological resources were identified in the Project area.

Sacred Lands File Search

ICF contacted the NAHC on January 24, 2018, to identify any areas of concern within the Project area that may be listed in the NAHC's Sacred Land File. No responses were received from the initial request. ICF then sent out another request on January 25, 2019. The NAHC responded on January 28, 2019 stating that no Sacred Lands were identified within the Project area.

AB 52 Outreach and Consultation

Under Assembly Bill 52, lead agencies must avoid damaging effects on tribal cultural resources, when feasible, regardless of whether consultation occurred or is required. Therefore, the County proceeded with outreach to the NAHC and local tribes.

In January 2019, the County submitted a letter to the Native American Heritage Commission with documentation of the NOP for the Project. On January 25, 2019 the NAHC responded to the letter, acknowledging receipt of the NOP and provided guidance for AB 52 consultation.

On February 1, 2019 the County emailed a letters to the following tribes inviting them to consult on behalf of AB 52. Although the tribes had not formally requested notice under PRC Section 21080.3.1(d), they were identified as tribes that are culturally and traditionally affiliated with the Project area and thus the County invited them to participate in consultation under AB 52.

- Andrew A. Galvan, Ohlone Indian Tribe;
- Tony Cerda, Chairperson, Coastanoan Rumsen Carmel Tribe;
- Irenne Zwierlein, Chairperson, Amah Mutsun Tribal Band of Mission San Juan Bautista;
- Rosemary Cambra, Chairperson, Muwekma Ohlone Indian Tribe of the SF Bay Area;
- Katherine Erolinda Perez, Chairperson, North Valley Yokuts Tribe.

At the time the Draft SEIR was released for public review, the County had not received any responses for Tribal consultation and no tribal cultural resources have been identified in the Project area.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the proposed Project would be considered to have a significant effect if it would result in any of the conditions listed below.

- A substantial adverse change in the significance of a tribal cultural resource, defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:
  - Listed or eligible for listing in the CRHC, or in a local register of historical resources as defined in PRC Section 5020.1(k), or
  - A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC Section 5024.1. In applying the criteria set forth in subdivision (c) of PRC Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

Impacts and Mitigation Measures

Impact TCR-1: Potential to cause a substantial adverse change in the significance of a tribal cultural resource with cultural value to a California Native American tribe and that is listed or eligible for listing in the California Register of Historical Resources or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k) (less than significant)

The results from the search of the NAHC's Sacred Lands Files, and outreach efforts by the County pursuant to AB 52, as discussed in the *Methods for Analysis* section, did not identify any tribal cultural resources in or near the Project area. Therefore, there would be no significant impact and no mitigation is required.

Impact TCR-2: Potential to cause a substantial adverse change in the significance of a tribal cultural resource with cultural value to a California Native American tribe and that is a resource determined by the lead agency to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. (less than significant)

The results from the search of the NAHC's Sacred Lands Files, and outreach efforts by the County pursuant to AB 52, as discussed in the *Methods for Analysis* section, did not identify any tribal cultural resources in or near the Project area. Therefore, there would be no significant impact and no mitigation is required.

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3.18 Utilities and Service Systems

This section describes the regulatory and environmental setting for utilities and service systems in the Project area. It also describes impacts on utilities and service systems that would result from implementation of the Project.

3.18.1 Existing Conditions

Regulatory Setting

Federal

Clean Water Act

Section 304 of the Clean Water Act establishes primary drinking water standards and requires states to ensure that potable water retailed to the public meets these standards. State primary and secondary drinking water standards are promulgated in California Code of Regulations Title 22, Sections 64431–64501. Secondary drinking water standards incorporate nonhealth risk factors including taste, odor, and appearance. The National Pollutant Discharge Elimination System (NPDES) regulates the discharge of drainage to surface waters. Federal NPDES regulations are administered by the State Water Resources Control Board (State Water Board) and through the Regional Water Resources Control Boards (Regional Water Boards). Because the proposed Project area drains to the Central Valley and to San Francisco Bay, it is under the jurisdiction of both the Central Valley Water Board and the San Francisco Bay Regional Water Board.

Municipal storm drainage is required to meet board standards under waste discharge regulations and NPDES permits.

State

Porter-Cologne Water Quality Control Act (Section 13000 et seq.)

The Porter-Cologne Water Quality Control Act directs the State Water Board and Regional Water Boards to prepare water quality control plans (basin plans) that establish water quality objectives and beneficial uses for each body of water, including groundwater basins, within the regional boundaries. The Porter-Cologne Act empowers the State Water Board and Regional Water Boards to protect the beneficial use of California waters, thereby providing broader authority than offered by the Clean Water Act alone. The State Water Board and Regional Water Boards adopt regulations to protect surface water quality.

California Energy Commission

The California Energy Commission (CEC) regulates the provision of natural gas and electricity within the state. The CEC is the state's primary energy policy and planning agency and has five major responsibilities: forecasting future energy needs and keeping historical energy data, licensing thermal power plants 50 megawatts or larger, promoting energy efficiency through appliance and building standards, developing energy technologies and supporting renewable energy, and planning for and directing the state response to energy emergencies.

California Integrated Waste Management Board

The California Integrated Waste Management Board is the state agency designated to oversee, manage, and track California's 76 million tons of waste generated each year. It is one of the six agencies under the umbrella of the California Environmental Protection Agency. The California Integrated Waste Management Board develops laws and regulations to control and manage waste; enforcement authority is typically delegated to the local government. The board works jointly with local government to implement regulations and fund programs.

Pursuant to the California Integrated Solid Waste Management Act of 1989, all cities in California are required to reduce the amount of solid waste disposed in landfills. Contracts that include work that will generate solid waste, including construction and demolition debris, have been targeted for participation in source-reduction, reuse, and recycling programs. Contractors are urged to manage solid waste to divert waste away from disposal in landfills (particularly Class III landfills) and to maximize source reduction, reuse, and recycling of construction and demolition debris.

Department of Water Resources

In June 1991, California Department of Water Resources (DWR) published Bulletin 74-90 as a supplement to Bulletin 74-81, Water Well Standards: State of California, December 1981. Together, the two bulletins form the complete minimum Well Standards for the construction, maintenance, abandonment and destruction of water wells, monitoring wells and cathodic protection wells. DWR requires that wells be in good working order with adequate protection measures in place to protect persons/animals if the intent is to use the well in the future. If the well is not to be used, DWR requires the well be abandoned one year after last use of the well.

Wastewater

In the Project area, wastewater is regulated by the agencies listed below.

- State Water Board.
- San Francisco Bay Regional Water Board.
- California Department of Pesticide Regulation.
- California Department of Toxic Substances.

Local

The Alameda County Public Works Agency, (ACPWA) Water Resources Section is responsible for all well permitting activities for nine cities and unincorporated western Alameda County and manages all drilling permit applications within its jurisdiction, The ACPWA is the administering agency of County General Ordinance Code, Chapter 6.88. The purpose of the code is to prevent pollution or contamination of groundwater such that water obtained from water wells will be suitable for the beneficial uses intended and shall not jeopardize the health, safety, or welfare of the people of the county. The county also regulates the destruction of abandoned wells or wells found to be public nuisances. The provisions of these laws are administered and enforced by ACPWA through its Well Standards Program.

Environmental Setting

Water Service

The Alameda County Water District provides water service to the cities of Fremont, Union City, and Newark. Rural residences in eastern unincorporated Alameda County obtain water from private wells. No water service is provided at the existing windfarms. During construction, water needed for dust suppression, road compaction, and drinking would be obtained through public suppliers (e.g., from Zone 7 Water Agency, Byron-Bethany Irrigation District, the City of Livermore). Water for operations would be obtained from a groundwater source by installing an onsite well. For more information regarding water use and the results of the water supply assessment prepared for the Project, see Section 3.10, *Hydrology and Water Quality*.

Wastewater

No sewer or septic systems are present or proposed at the Project site. During construction, a local sanitation company would provide and maintain appropriate sanitation facilities (i.e., portable toilets). If necessary, additional temporary facilities would be placed at specific construction locations.

Stormwater Drainage

The Project area is located entirely in a rural setting; stormwater runoff drains primarily through natural drainage swales, ditches, and watercourses. No stormwater drainage facilities are proposed as part of the Project. Because the Project would disturb more than 1 acre, it would require coverage under the state's General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order 2010-0014-DWQ) (Construction General Permit). Consequently, a stormwater pollution prevention plan (SWPPP) would be prepared. The SWPPP would include erosion control best management practices. See Section 3.10, *Hydrology and Water Quality*, for further discussion of drainage in the Project area.

Solid Waste Disposal

Two permitted, large-volume landfills are active in Alameda County: Vasco Road Landfill and the Altamont Landfill. The Vasco Road Landfill is located at 4001 North Vasco Road in Livermore. The facility accepts a variety of materials including nonhazardous industrial waste including nonfriable asbestos, contaminated soil, municipal wastewater treatment plant sludge, construction and demolition wastes, empty containers, and other industrial and special wastes (Contra Costa County n.d.). Vasco Road Landfill is estimated to have sufficient capacity through 2030 (City of Livermore 2010:8).

The Altamont Landfill is located at 10840 Altamont Pass Road in Livermore and has disposal capacity through 2045 (Waste Management 2019). It accepts for disposal all nonhazardous municipal solid wastes, nonhazardous industrial and special wastes, dewatered wastewater treatment plant sludge (biosolids), treated auto shredder wastes, construction and demolition debris, and liquids for solidification (Waste Management 2014).

3.18.2 Environmental Impacts

Methods for Analysis

Identifying the impacts of the Project on utilities and service systems involved a review of Project information and applicable regulations.

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the proposed Project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.
- Have sufficient water supply to serve the Project and reasonably foreseeable future development during normal, dry, and multiple dry years.
- A determination by the wastewater treatment provider that serves or may serve the Project that it does not have adequate capacity to serve the Project's projected demand in addition to the provider's existing commitments.
- Generation of solid waste in exceedance of state or local standards or in excess of the capacity of local infrastructure, or other impediment to the attainment of solid waste reduction goals.
- Failure to comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

Impacts and Mitigation Measures

Impact UT-1: Relocation or construction of new or expanded water, wastewater treatment, stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction of which could cause significant environmental effects (less than significant)

The Project would not substantially modify the existing stormwater drainage patterns in the Project area, and increases in impermeable surfaces onsite would be primarily limited to tower foundations. In addition, because the Project would disturb more than 1 acre, it would require coverage under the state's Construction General Permit. Coverage under this permit requires developing and complying with a SWPPP. Consequently, impacts related to construction of new stormwater drainage facilities or expansion of existing facilities would be very minor.

The proposed Project would not generate a significant amount of wastewater, and water for construction use at the Project area would be trucked in. A new onsite well will be constructed for operational use. A well drilling permit from ACPWA would be required. Compliance with ACPWA's Well Standards Program and Chapter 6.88 of the County General Ordinance Code would ensure impacts relating to well construction and operations would be minimal. This impact would be less than significant and no mitigation is required.

The Project itself would generate electric power through wind turbines. No new natural gas or telecommunication facilities would be required. There would be no impact and no mitigation is required.

Impact UT-2: Have sufficient water supply to serve the Project and reasonably foreseeable future development during normal, dry, and multiple dry years (less than significant)

Water quantities used for the Project are expected to be minimal. The majority of water use would take place during construction. Water would be used for concrete mixing for the turbine tower and electrical substation foundations, as well as for dust control on roads and during grading and site work. Daily water use would vary. A minimal amount of water would be required for construction worker needs (e.g., drinking water, sanitation facilities). The Project proponent plans to draw needed water for water trucks and drinking water from an offsite source for construction and from a new onsite well for operations. As discussed in Section 3.10, *Hydrology and Water Quality*, the water supply assessment prepared for the Project concluded that there is an adequate water supply available to meet the needs of the proposed Project and would not decrease groundwater supplies. In addition, compliance with the ACPWA's Well Standards Program and Chapter 6.88 of the County General Ordinance Code would ensure impacts relating to water supply to less than significant.

The use of water is expected to be minimal, and no new or expanded entitlements to supply the Project during construction or operation are anticipated. This impact would be less than significant. No mitigation is required.

Impact UT-3: Project-related exceedance of existing wastewater treatment capacity (no impact)

The proposed Project would not generate a significant amount of wastewater. No sewer or septic systems are present or proposed at the Project site, and portable toilets would be provided during construction. Therefore, the Project would not impact any wastewater treatment facilities' capacity. There would be no impact. No mitigation is required.

Impact UT-4: Project-related exceedance of state or local solid waste standards or of the capacity of local infrastructure, or other impediments to attaining solid waste reduction goals (less than significant)

The majority of solid waste generated would be during construction and during the decommissioning of turbines. The Project is not anticipated to generate a substantial amount of solid waste because turbines and components would be sold or recycled, which would reduce the amount of solid waste taken to landfills. It is not anticipated that the construction or operation of the Project would generate enough solid waste to affect the capacity of any landfill. This impact would be less than significant. No mitigation is required.

Impact UT-5: Inconsistency with federal, state, and local management and reduction statutes and regulations related to solid waste (no impact)

As indicated above, the majority of solid waste (turbines and components) generated by the Project would be sold or recycled. The Project would be required to comply with local, state, and federal solid waste regulations. There would be no impact and no mitigation is required.

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3.19 Wildfire

This section describes the environmental and regulatory setting for wildfire in the Project area. As described in Chapter 2, *Project Description*, the Project area is located in the eastern Altamont Pass area of Alameda County.

3.19.1 Existing Conditions

Regulatory Setting

Federal

Disaster Mitigation Act of 2000

The Disaster Mitigation Act of 2000 provides the legal basis for the Federal Emergency Management Agency's (FEMA) mitigation planning requirements for state, local, and tribal governments as a precursor to mitigation grant assistance. The Disaster Mitigation Act of 2000 requires that local governments prepare a Local Hazard Mitigation Plan that must be reviewed by the State Mitigation Officer, approved by FEMA, and renewed every 5 years. The plan must include a planning process, a risk assessment, a mitigation strategy, and plan maintenance and updating procedures to identify the natural hazards, risks, and vulnerabilities of the area under the jurisdiction of the government. Natural hazards include earthquakes, tsunamis, tornadoes, hurricanes, flooding, and wildfires.

State of California

Senate Bill 1241 (Statutes of 2012, Kehoe)

Senate Bill 1241 revised the safety element requirements for State Responsibility Areas (SRAs) and very high fire hazard severity zones. The bill requires that any revisions of general plans' housing element after January 2014 must also include the revision and updating of the safety element, as necessary, to address the risk of fire in SRAs and very high fire hazard severity zones.

Public Resources Code Section 4291

Section 4291 of the California Public Resources Code defines and describes fire protection measures and responsibilities for mountainous, forest, brush, and grass-covered lands. These measures include, but are not limited to, the following.

- Maintenance of defensible space of 100 feet from each side and from the front or rear of a structure, but not beyond the property line.
- Removal of a portion of a tree that extends within 10 feet of the outlet of a chimney or stovepipe.
- Maintenance of a tree, shrub, or other plant adjacent to or overhanging a building free of dead or dying wood.
- Construction or rebuilding of a structure must comply with all applicable state and local building standards.

State Responsibility Areas Public Resources Code 4102

SRAs are defined by California Public Resources Code Section 4102 as areas of the state in which the State Board of Forestry and Fire Protection has determined that the financial responsibility for preventing and suppressing fires lies with the State of California. SRAs are lands in California where the California Department of Forestry and Fire Protection (CalFire) has legal and financial responsibility for wildfire protection. SRA lands typically are unincorporated areas of a county, are not federally owned, have wildland vegetation cover, have housing densities lower than three units per acre, and have watershed or range/forage value. Where SRAs contain built environment or development, the local government agency assumes responsibility for fire protection.

LRAs include lands that don't meet criteria for SRAs or federal responsibility areas, or are lands in cities, cultivated agricultural lands, and nonflammable areas in the unincorporated parts of a county. LRAs can include flammable vegetation and wildland-urban interface areas. LRA fire protection is provided by the local fire departments, fire protection districts, county fire departments, or by contract with CalFire.

Very High Fire Hazard Severity Zones Government Code 51177

Very High Fire Hazard Severity Zones are defined by Government Code Section 51177 as areas designated by the Director of Forestry and Fire Protection as having the highest possibility of having wildfires. These zones are based on consistent statewide criteria and the severity of fire hazard that is expected to prevail in those areas. The zones are also based on fuel loading, slope, fire weather, and other factors, such as wind, that have been identified by the Department of Forestry and Fire Protection as a major cause of the spreading of wildfires. Fire Hazard Severity Zone maps are produced and maintained for each county.

2018 California Strategic Fire Plan

The Board of Forestry and Fire Protection's Strategic Fire Plan provides an overall vision for a built and natural environment that is more fire resilient through the coordination and partnerships of local, state, federal, tribal, and private entities. First developed in the 1930s, the Strategic Fire Plan is periodically updated; the current plan was prepared in 2018. The Plan analyzes and addresses the effects of climate change, overly dense forests, prolonged drought, tree mortality, and increased severity of wildland fires through goals and strategies. The primary goals of the 2018 Strategic Fire Plan are to do the following.

- Improve the availability and use of consistent, shared information on hazard and risk assessment.
- Promote the role of local planning processes, including general plans, new development, and existing developments, and recognize individual landowner/homeowner responsibilities.
- Foster a shared vision among communities and the multiple fire protection jurisdictions, including county-based plans and community-based plans such as Community Wildfire Protection Plans.
- Increase awareness and actions to improve fire resistance of man-made assets at risk and fire resilience of wildland environments through natural resource management.
- Integrate implementation of fire and vegetative fuels management practices consistent with the priorities of landowners or managers.

- Determine and seek the needed level of resources for fire prevention, natural resource management, fire suppression, and related services.
- Implement needed assessments and actions for post-fire protection and recovery.

Local

Alameda County General Plan

The *Safety Element of the Alameda County General Plan* (Alameda County 2013) contains goals, policies, and actions the County might take related to nonnatural hazards and fire hazards. Many of the principles and actions refer to new development. Those relating to the proposed Project as an existing facility are excerpted below.

> **Goal 2. To reduce the risk of urban and wildland fire hazards.**
>
> > **P3.** Development should generally be discouraged in areas of high wildland fire hazard where vegetation management programs, including the creation and maintenance of fuel breaks to separate urban uses would result in unacceptable impacts on open space, scenic and ecological conditions.

East County Area Plan

The Environmental Health and Safety Elements of the ECAP contain two programs related to wildland fire hazards (Alameda County 2000).

Environmental Health and Safety

> **Program 117:** The County shall work with the California Department of Forestry and Fire Protection to designate "very high fire hazard severity zones" in conformance with AB 337 (1992). The County shall ensure that all zones designated as such meet the standards and requirements contained in this legislation.
>
> **Program 118:** The County shall prepare a comprehensive wildland fire prevention program including fuelbreaks, brush management, controlled burning, and access for fire suppression equipment.

Environmental Setting

The environmental setting for wildfire describes the existing conditions within the Project area, and APWRA as they relate to wildfire. The term *wildfire* refers to an unplanned, unwanted, wildland fire, including unauthorized human-caused fires, escaped wildland fire use events, escaped prescribed fire projects, and all other wildland fires where the objective is to extinguish the fire (Government Code Section 51177). Wildfire's characteristics depend on the circumstances where the fire is burning. Brush fires, which burn both natural vegetation and dry-farmed grain, typically burn fast and very hot, and often threaten homes in the area and lead to serious destruction of vegetation. Woodland fires are relatively cool under natural conditions; however, if a brush fire spreads to a woodland, it could generate a destructive hot crown fire. Currently, no suitable management technique of reasonable cost has been devised to reduce the risk of these fires. However, these fires can typically be controlled relatively quickly and easily if they are reachable by fire equipment.

Short-term effects of wildfires include destruction of timber, and loss of wildlife habitat, scenic vistas, and watersheds. Long-term effects of wildfires include smaller timber harvests, reduced access to recreational areas, and destruction of community infrastructure and cultural or economic resources. Wildfires also increase the area's vulnerability to flooding. Wildfire damage to life and property is generally greatest in areas designated as wildland-urban interface, where development is in close proximity to densely vegetated areas.

Additionally, climate change is expected to contribute to significant changes in fire regimes. Fire is a natural component of many ecosystems and natural community types, including grasslands, chaparral/scrub, and oak woodland. For each of these natural communities, fire frequency and intensity influence community regeneration, composition, and extent. Wildfire frequency, size, and intensity are expected to increase over time throughout the inventory area. The number of wildfires is projected to increase by 51 percent, while total area burned by contained fires is projected to increase 41 percent despite enhancement of fire suppression efforts (California Department of Fish and Wildlife 2015).

Fire hazards pose a considerable risk to vegetation and wildlife habitats throughout the APWRA. Specifically, the Project area consists primarily of grassland and grazing land. Dry climate conditions create circumstances rich with fuels, although active grazing, agricultural irrigation, and landscape irrigation provides some fuel reduction. Human activities are the primary reason wildfires start, although lightning strikes do occasionally occur. The most likely source of an ignition from the Project would be hardware or conductor failures of power collection lines, dropping of collection lines, turbine malfunction or mechanical failure, and avian-related incidents. In addition, during construction, additional work crews would be required, temporarily increasing the number of vehicles in the Project area. Climate conditions together with the potential for vehicle-related ignitions increase the potential for ignition, especially during the summer months.

3.19.2 Environmental Impacts

Five general categories of fire origin are associated with wind generators: hardware and conductor failures of power collection lines, dropping of collection lines, turbine malfunction or mechanical failure, construction-related accidents, and avian related incidents.

Wildfires related to power collection lines and malfunction or mechanical failure of turbines can result from turbine overload, bearing overheating, or pendant cable failure; such incidents occur primarily on older units. (A pendant cable is a collection of low-voltage and communication cables, which drop through the top of the turbine support structure and connect to a weather head or junction box at a lower level on the tower.) If not properly maintained, these cables may twist and bind or rub and cause an electrical short, emitting sparks or flames. On unenclosed towers the sparks can escape the structure more easily. Avian-related incidents (i.e., electrocuted birds) involving birds catching fire and falling to the ground have also been a source of wind generator–related fires in the Project area.

Methods for Analysis

This section describes the methods for analyzing the impacts of implementing the proposed Project. Criteria from Appendix G of the State CEQA Guidelines were used to determine whether the Project would have a significant impact related to wildfire. Impacts related to wildfire were assessed based on consultation with the County's planning staff, and review of applicable documents such as the *Alameda County General Plan* (Alameda County 2013).

Thresholds of Significance

In accordance with Appendix G of the State CEQA Guidelines, the proposed Project would be considered to have a significant effect if it would result in any of the conditions listed below.

- Substantial impairment of an adopted emergency response plan or emergency evacuation plan.
- As a result of slope, prevailing winds, or other factors, the exacerbation of risks of and exposure of Project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire.
- Installation or maintenance of Project-associated infrastructure (e.g., roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts on the environment.
- Exposure of people or structures to significant risks such as downslope or downstream flooding or landslide as a result of runoff, post-fire slope instability, or drainage changes.

Impacts and Mitigation Measures

Impact WF-1: Substantial impairment of an adopted emergency response plan or emergency evacuation plan (less than significant with mitigation)

Existing vehicular traffic is associated with operations and maintenance of Project facilities and is not anticipated to change under the proposed Project. Accordingly, operation of the Project would have no impact.

Large, slow-moving construction and delivery vehicles and temporary road and lane closures could delay or obstruct roadways used for emergency evacuation, as disclosed in the PEIR. Implementation of PEIR Mitigation Measure TRA-1, however, would reduce this impact to a less-than-significant level. Construction traffic routing would be established in a Construction Traffic Plan, which would include a traffic safety and signing plan prepared by the Project engineers in coordination with Alameda County and other related agencies to ensure adequate emergency route access at all times. All required permits from the County and/or Caltrans would be acquired before the construction of the Project.

PEIR Mitigation Measure TRA-1: Develop and implement a construction traffic control plan

Impact WF-2: Exacerbation of wildfire risks associated with pollutant concentrations or uncontrolled spread of wildfire (less than significant)

The Project area is located in an area of moderate wildfire risk, not in areas classified as high or very high fire hazard severity zones (California Department of Forestry and Fire Protection 2007). Construction would be a temporary activity; an active working crew would control any potential combustible materials though standard OSHA worker protection requirements. Temporary onsite water tanks and water trucks would be made available for fire support.

As discussed above, wind energy facilities are prone to fire ignition from different sources. However, as described above in Chapter 2, *Project Description*, standard O&M procedures would be employed in the event of downed power lines. The turbines would be equipped with internal protective control mechanisms to safely shut them down in the event of a high-voltage grid outage or a turbine failure related to fire or mechanical problems.

The potential for wildland fires however, already exists in the Project area due to the presence of the existing wind energy facilities. Moreover, the improved safety of newer models associated with repowered projects are anticipated to result in a reduction of potential fire ignitions. Because CalFire and Alameda County Fire Department already provide fire protection services to the Project area, the fire protection facilities and infrastructure required to protect the existing facilities are in place. During construction, temporary onsite water tanks and water trucks would be made available, in part, for fire water support.

The PEIR concluded that the fire-related impact of individual repowering projects would be less than significant, and no mitigation is required. The proposed Project would comply with the Altamont Pass Wind Farms Fire Requirements as described in Exhibit C of the 2005 Conditional Use Permits. Consequently, the potential for exposure of people or structures to a significant risk of loss, injury, or death involving wildland fires is less than significant, and no mitigation is required.

Impact WF-3: Project-related installation or maintenance of associated infrastructure that may exacerbate fire risk or result in temporary or ongoing environmental impacts (less than significant)

As discussed above Impact WF-2, implementation of the Project would carry with it a potential for fire ignition risks (e.g., turbine overload, bearing overheating, pendant cable failure; avian-related incidents). However, employing standard measures to reduce fire risks during construction and standard O&M procedures as described above during operation and maintenance, fire risks would be reduced.

The PEIR concluded that the fire-related impact of individual repowering projects would be less than significant, and no mitigation is required. The proposed Project would comply with the Altamont Pass Wind Farms Fire Requirements as described in Exhibit C of the 2005 Conditional Use Permits. Consequently, the potential for exposure of people or structures to a significant risk of loss, injury, or death involving wildland fires is less than significant, and no mitigation is required.

Impact WF-4: Exposure of people or structures to significant risks such as downslope or downstream flooding or landslide as a result of runoff, post-fire slope instability, or drainage changes (less than significant)

The PEIR concluded that impacts related to flooding, landslides, runoff, and drainage changes would be less-than-significant with implementation of WQ-1: Comply with NPDES requirements. As discussed in more detail in Section 3.7, *Geology, Soils, and Paleontological Resources*, and Section 3.10, *Hydrology and Water Quality*, design requirements to minimize risk of exposure to geologic and hydrologic hazards, including flooding, landslides, runoff, and drainage changes would be required.

The Project area is within an area of sloping landscape. If a wildfire were to take place on these slopes, there could be an increase in risk of landslide or flooding due to post-fire slope instability, which occurs when a wildfire removes the vegetation that holds soils in place, making it more likely for soil to move downslope, especially in tandem with precipitation.

However, as discussed under Impact WF-2, the risk of wildfire within the inventory area would be minimized through compliance with all pertinent local, state, and federal policies and codes and Project BMPs. Post-wildfire risk also would be reduced with implementation of applicable policies and regulatory requirements. Consequently, the potential for exposure of people or structures to significant risks related to flooding landslides, or drainage changes is less than significant, and no mitigation is required.

3.19.3 References Cited

Printed References

Alameda County. 2000. *East County Area Plan*. Adopted May 1994. Modified by passage of Measure D, effective December 22, 2000. Oakland, CA.

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California Department of Forestry and Fire Protection 2007. *Fire Hazard Severity Zone*. Map Adopted November 2007. Available: http://www.fire.ca.gov/fire_prevention/fhsz_maps_alameda.php. Accessed: April 25, 2019.

Chapter 4
Alternatives Analysis

According to Section 15126.6 of the State CEQA Guidelines, an EIR must describe a reasonable range of feasible alternatives to the project or project location that could feasibly attain most of the basic project objectives and that would avoid or substantially lessen any of the significant impacts of the proposed project. Accordingly, alternatives that do not avoid or substantially lessen significant impacts of a project do not need to be analyzed in an EIR, including alternative locations. However, the focus of the discussion is to consider alternatives that reduce or avoid significant impacts even if they would impede to some degree the attainment of project objectives or would be more costly. Additionally, the Guidelines require analysis of a no project alternative to allow decision makers to compare the impacts of project approval with the impacts of not approving the project. ~~Special considerations for analysis of the no project alternative are understood to allow for comparative evaluation of both conditions with future development of another permissible or potential project, and conditions in which the property remains in its existing state.~~ The EIR must in any case evaluate the comparative merits of all the feasible alternatives~~,~~ and describe them in sufficient detail to allow for meaningful evaluation and analysis. The EIR must also identify the environmentally superior alternative, which may be the no project alternative, but, if so, shall also identify an environmentally superior alternative from among the other project alternatives. An EIR is not required to present the alternatives analysis at the same level of detail as the assessment of the project, and it is not required to consider every conceivable alternative to a project. Rather, an EIR must consider a reasonable range of potentially feasible alternatives that will foster informed decision making.

This chapter is organized into the sections listed below.

- *Alternatives Screening Process* describes the project objectives, significant impacts of the project, and the alternatives considered.
- *Alternatives Analyzed* presents a qualitative analysis comparing the alternatives considered with the proposed project.
- *Environmentally Superior Alternative* presents the alternative that would result in the least amount of environmental impacts.

4.1 Alternatives Screening Process

CEQA requires that an EIR describe a reasonable range of feasible alternatives to the project, or to the location of the project, that could substantially reduce one or more of the project's significant environmental impacts while meeting most or all of the project's objectives. The EIR is required to analyze the potential environmental impacts of each of the alternatives, although not at the same level of detail as that at which the project is analyzed. There must be sufficient detail to facilitate comparing the respective merits of the alternatives.

Key provisions of the State CEQA Guidelines (Section 15126.6) pertaining to the alternatives analysis are summarized below.

- The discussion of alternatives will focus on alternatives to the project or its location that are feasible, meet most or all of the project objectives, and would substantially reduce one or more of the project's significant effects.
- The range of alternatives must include the no project alternative. The no project analysis will discuss the existing conditions at the time the notice of preparation was published, or if no notice of preparation was published, at the time when environmental analysis is commenced, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved based on current plans and consistent with available infrastructure and community services. The no project alternative is not required to be feasible, meet any of the project objectives, or reduce the project's expected impacts to any degree.
- The range of alternatives required in an EIR is governed by a *rule of reason*; therefore, the EIR must evaluate only those alternatives necessary to permit a reasoned choice. An EIR is not required to analyze every conceivable alternative to a project.
- An EIR need not consider an alternative whose effects cannot be reasonably ascertained, whose implementation is remote and speculative, or that would not achieve the basic project objectives.

4.1.1 Screening Criteria

A range of potential alternatives was subjected to screening criteria to eliminate those potential alternatives that do not qualify as alternatives under CEQA. As discussed above, there was no attempt to include every conceivable alternative in this range. Rather, the County selected a number of representative alternatives to consider. The screening criteria for the potential alternatives are relatively simple.

- Does the alternative meet most or all of the Project objectives?
- Is the alternative potentially feasible?
- Would the alternative substantially reduce one or more of the significant effects associated with the program or Project?

4.1.2 Project Objectives

As described in Chapter 2, *Project Description*, the underlying purpose of the Project is to repower a large segment of the program area with a commercially viable wind energy facility that would be subject to a single, uniform avian monitoring protocol and help meet the state's Renewables Portfolio Standard (RPS), greenhouse gas (GHG) reduction, and carbon neutrality goals.

The fundamental objectives of the Project are as follows:

- To maximize wind energy production for Power Purchase Agreements obtained for the Project by siting up to forty new wind turbines on leased lands within the program area.
- To maintain commercial viability.

The secondary objectives of the Project are as follows:

- To minimize environmental impacts by:
  - Limiting ground disturbance through the re-use of existing infrastructure (e.g., roads, transmission lines) where feasible.
  - Improving understanding of the effects of new generation turbines on birds and bats by applying the same avian mortality monitoring protocol across a large segment of the program area, rather than separate protocols for multiple separate projects.
- To increase local short-term and long-term employment opportunities.
- To provide economic benefits to Alameda County.
- To assist California in meeting its RPS, GHG reduction, and carbon neutrality goals.

4.1.3 Feasibility

Feasible is defined as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors" (State CEQA Guidelines Section 15364). CEQA does not require that an EIR determine the ultimate feasibility of a selected alternative but rather that it is probably feasible. ~~Accordingly, no economic studies have been prepared regarding the economic feasibility of the selected alternatives.~~

4.1.4 Significant Impacts

Alternatives to the Project are identified for the purpose of avoiding or minimizing the significant impacts of the Project. The analysis in this EIR concluded that impacts related to the following topics would be significant after implementation of mitigation measures.

- Impact BIO-11: Avian mortality resulting from interaction with wind energy facilities (Avian Mortality) – Implementation of the mitigations recommended by Mitigation Measures BIO-11a, BIO-11b, BIO-11c, BIO-11d, BIO-11e, BIO-11f, BIO-11g, BIO- 11h, and BIO-11i will reduce the rate of avian mortality associated with the Project but will not mitigate this impact to a less-than-significant level, as there is no feasible way to avoid the significant impact.
- Impact BIO-14: Turbine-related fatalities of special-status bats and other bats (Bats) – Implementation of the mitigations recommended by Mitigation Measures BIO-14a, BIO-14b, BIO-14c, BIO-14d, and BIO-14e will reduce the rate of bat mortality associated with the Project but will not mitigate this impact to a less-than-significant level, as there is no feasible way to avoid the significant impact.
- Impact BIO-19: Potential impact on the movement of any native resident or migratory wildlife species or established native resident or migratory wildlife corridors, and the use of native wildlife nursery sites Biological Resources (Wildlife Corridors) – Implementation of Mitigation Measures BIO-11b, BIO-11c, BIO-11d, BIO-11e, BIO-11i, BIO-12a, BIO-12b, BIO-14a, and BIO-14d would reduce this impact, but will not mitigate this impact to a less-than-significant level, as there is no feasible way to avoid the significant impact.

Table ES-1 lists the significant impacts of the proposed Project.

4.1.5 Alternatives Subjected to Screening

The following alternatives were considered and subjected to the screening process described above. No alternative site location was considered, because the proposed Project site is within the APWRA, designated for wind energy development and the subject of the PEIR for repowering of the kind generally proposed for the Project. No off-site location outside of the APWRA would be reasonably feasible based on the County's General Plan land use designations or wind resource availability. No alternative project location within the APWRA would be expected to avoid or substantially lessen the Project's significant impacts, although repowering of the entire APWRA was considered in the Program EIR.

No Project – Repowering by Others

Under the No Project – Repowering by Others alternative, sPower would not repower the Project site. However, because of the site's unique wind resources, location within the Program Area, and proximity to existing transmission lines and substations, it is reasonable to expect, based on current plans and consistent with available infrastructure, that the Project sites would be repowered in the foreseeable future by one or more wind companies, using turbines described in the PEIR and made subject to the same regulatory regime as other repowering proposals and achieving roughly the same MW production capacity. Any remaining turbine foundations would be removed as required by County regulations and policies, and road improvements and equipment laydown requirements would be assumed to be comparable to the Project.

No Project – No Repowering

Under the No Project – No Repowering alternative, no repowering would occur, and the Project area would be restored to pre-permit conditions with restrictions against further installation of wind turbines on the Sand Hill Project sites for the foreseeable future.

Smaller Turbine – Pre-Micro-Sited Layout

Under the Smaller Turbine – Pre-Micro-Sited Layout alternative, Sand Hill would install the same number of turbines as the Project – up to 40 – but would substitute the 35 proposed turbines of more than 3.0 MW in operating capacity (3.6-, 3.8- or potentially 4.0-MW-rated turbines) with moderately smaller, 2.8-MW turbines, and would place ~~some~~most of the turbines at locations determined through two sequential micro-siting studies that were conducted with the objective of potentially reducing bat and avian impacts. Although the number of turbines within the leased parcels would remain the same as under the proposed Project, ~~some~~roughly one half of the turbine locations would be different. In total, the Smaller Turbine – Pre-Micro-Sited Layout alternative relocates ~~19~~ 17 of the proposed Project's 40 turbines in response to expert recommendations, reduces overall Project capacity by 24% from 144.5 MW to 109.5 MW, reduces rotor-swept area by 13%, from 568,775 m^2 to 496,220 m^2, and raises the average clearance of turbine blades by 75%, from 14.1 m to 24.7 m above the ground. This alternative follows an expert micro-siting recommendation at 24 turbine sites; uses a partial, modified, or secondary recommendation at five additional sites where the full recommendation could not be feasibly implemented; and reduces the turbine size at 10 of the 11 locations where turbines could not be relocated due to setback or other physical constraints.

Reduced Footprint

Under the Reduced Footprint alternative, the same number of new turbines would be installed as under the proposed Project within a reduced project area boundary, such as including only the areas where turbines existed as of 2010 when the PEIR began preparation, or roughly 1,600 acres. Because there would be the same number of turbines in a smaller area, turbine density would be greater under this alternative than under the proposed Project. It also assumes that the same size of turbines would be used as proposed for the Project, 3.6-, 3.8- or potentially 4.0 MW-rated turbines.

Avoid Specific Biologically Sensitive/Constrained Areas

This alternative would prescribe a turbine layout that would avoid placing new turbines in areas that would necessitate the construction of new roads traversing biologically sensitive or constrained areas. This alternative's perimeter and the total maximum number of wind turbines would be the same as under the proposed Project.

No New Roads

This alternative would entail installation of the same number of turbines in the same project area as the proposed Project, using helicopters to deliver all turbine components. As a result, no road widening or related improvements would be required.

Shrouded Turbines

Under this alternative, repowering would occur with the installation of shrouded turbines, such as previously proposed and approved for eight parcels (875 acres) of the current Project site (Planning application PLN2013-00013). The shrouded turbines would be much smaller and shorter than the turbines proposed under the Project and be placed on the entire Project site. Experimental technologies are being developed involving such turbines. The turbines would have nameplate capacities of approximately 100 kW and would be mounted on free-standing, smooth exterior finished towers. At the same turbine density as proposed in 2013, approximately 1,000 such turbines could be installed with a combined generation capacity of 100 MWs.

Airborne Wind Turbines

Under this alternative, the Sand Hill site would be repowered with airborne wind turbines (AWTs). An experimental AWT was proposed within the APWRA in 2013 (Planning application PLN2013-00157), with operation as a tethered airfoil with a wingspan of approximately 28 meters (91.9 feet) and a generation capacity of 600 kW. The wing would launch and land by hovering like a helicopter. The AWT operates in vertical loops from its tether, like the tip of a conventional wind turbine blade, completing each rotation in about 1–2 minutes. The altitude of the AWT during operation ranges from 459 to 1,067 feet. In concept, this alternative could use up to 12 such AWTs with a combined generating capacity of 72 MWs if distributed over the subject Sand Hill sites.

4.1.6 Alternatives Eliminated from Further Analysis

The following alternatives were eliminated from further consideration in the SEIR for the reasons described below.

Reduced Footprint

This alternative was eliminated because it would not achieve a fundamental objective of the Project and would not avoid or substantially reduce any significant effects of the Project. Turbine placement at the site is already heavily constrained and compressed to the maximum extent feasible. The County's setback requirements create a developable area that is highly restricted (i.e., approximately 30% less than the total Project area) and limits the degree to which the Project can be further compressed. For example, the industry standard for minimum spacing of turbines within rows (i.e., side-to-side) to avoid turbine wake interference that materially reduces power production is three rotor diameters. Thirty-eight turbines (95%) of the Project layout are already within 2.7 rotor diameters. Of those, thirty-one (77.5% of Project total) are within 2.5 rotor diameters. And of the thirty-one, eleven (27.5% of Project total) are within two rotor diameters. The resulting internal wake losses of 9% is high compared to other wind farms of this scale. Further compression of the turbines into a smaller footprint is infeasible because additional wake interference between turbines would substantially reduce their energy output and render the Project commercially infeasible. In addition, a Reduced Footprint alternative would only reduce the relatively small amount of additional disturbance caused by access road improvements, an effect which is already less-than-significant after mitigation. The Reduced Footprint alternative would increase rather than substantially reduce avian and bat impacts by reducing the amount of unoccupied air space between turbines, thereby increasing the likelihood of bat and avian mortalities throughout the Project site. The alternative was eliminated because it would not achieve a fundamental objective of the Project (commercial feasibility) and would increase rather than substantially reduce the Project's significant and unavoidable avian and bat impacts.

Avoid Specific Biologically Sensitive/Constrained Areas

This alternative was eliminated because the Project layout already avoids and minimizes construction impacts to the greatest extent feasible. Sand Hill has evaluated multiple layouts to help facilitate eventual micro-siting of the Project (see the Smaller Turbine – Pre-Micro-Sited Layout alternative), and wetland impacts are already minimized by siting turbines outside wetlands and aligning necessary road crossings of wetlands to be perpendicular to minimize impacts to the maximum extent possible. In short, because terrestrial biological resources impacts have already been significantly reduced and are mitigable, to the extent this alternative is intended to reduce the significant and unavoidable biological resources impacts of the proposed Project on avian and bat species, it is addressed by the more specific Smaller Turbine – Pre-Micro-Sited Layout alternative. When an EIR discusses a reasonable range of alternatives sufficient to foster informed decision-making, it is not required to discuss additional alternatives substantially similar to those discussed. In this instance the Avoid Specific Biologically Sensitive/Constrained Areas alternative is substantially similar to the Smaller Turbine – Pre-Micro-Sited Layout alternative that will be carried forward in the SEIR.

No New Roads

Because no new roads would be constructed under this alternative, the extent of ground-disturbing activities would be reduced compared with the activities conducted under the proposed Project.

However, the level of avian and bat mortality would be the same as under the proposed Project. Additionally, because the existing roads would not accommodate the trucks required for construction of the repowered wind turbines, helicopters would be used to transport large equipment and turbine components to Project sites for construction. Helicopters are infrequently used for new project installations throughout the United States due to cost and safety concerns. Further, extensive helicopter use to support delivery of the turbines would result in substantially higher adverse air quality emissions during construction due to fuel consumption. Receptors and local viewers surrounding the Project area would consider the impacts on aesthetics and noise to be greater than under the proposed Project because of the use of helicopters. The significant noise levels produced by prolonged use of helicopters could also disturb local fauna and potentially impair behavioral patterns such as breeding, feeding, or sheltering.

Finally, this alternative would reduce the relatively small amount of additional disturbance caused by access road improvements, an effect which is already less-than-significant after mitigation. The alternative would not avoid or substantially reduce any significant and unavoidable impacts of the proposed Project. This alternative was rejected by the County in its decision on the PEIR as infeasible because it would not with a high degree of certainty avoid or substantially reduce the significant and unavoidable impacts of the program and because it would also result in significant effects that exceed the effects of the program related to aesthetics and air quality.

Shrouded Turbines

Although the use of this experimental technology was previously considered for use on portions of the Project site, at the present time it is not market-ready for development at the commercial scale. Therefore, this alternative was eliminated as technically infeasible.

Airborne Wind Turbines

This alternative was eliminated as technically infeasible. Another wind company was exploring the use of this experimental technology as discussed in the description of the alternative, but to date it is not market-ready at the commercial scale. Further, and most importantly, there are FAA flight ceiling restrictions and lighting issues that would prohibit the use of this technology in the APWRA.

4.2 Alternatives Analyzed in the EIR

Of the eight alternatives considered in alternative screening, five were screened out, as described above. The following alternatives were evaluated in comparison to the proposed Project in this SEIR.

- No Project – Repowering by Others
- No Project – No Repowering
- Smaller Turbine – Pre-Micro-Sited Layout

In several cases, the severity of the impact may be the same under the alternatives as measured against the CEQA significance thresholds (e.g., both the Project and a given alternative would result in a less-than-significant impact). However, the actual magnitude of the impact may be slightly different, providing the basis for a conclusion of greater or lesser impacts, even though both are considered less than significant. Table 4-1 presents a summary matrix of the Project impacts in comparison with the three alternatives.

Table 4-1. Comparison of Project Alternatives to the Project

		Impact Compared to Proposed Project		
Environmental Topic Area	Level of Project Impact	No Project – Repowering by Others	No Project – No Repowering	Smaller Turbine – Pre-Micro-Sited Layout
Aesthetics	Less than significant with mitigation	Similar	Less	Similar
Agricultural and Forestry Resources	No impact	Similar	Similar	Similar
Air Quality	Less than significant with mitigation	Similar	Less	Similar
Biological Resources	Significant and unavoidable	Similar	Less	Less
Cultural Resources	Less than significant with mitigation	Similar	Less	Similar
Energy	No impact	Similar	Greater	Similar
Geology, Soils, Mineral Resources, and Paleontology	Less than significant with mitigation	Similar	Similar	Similar
Greenhouse Gas Emissions	Less than significant with mitigation	Similar	Greater	Similar
Hazards and Hazardous Materials	Less than significant with mitigation	Similar	Less	Similar
Hydrology and Water Quality	Less than significant with mitigation	Similar	Less	Similar
Land Use and Planning	No impact	Similar	Less	Similar
Noise (Short-term)	Less than significant with mitigation	Similar	Less	Similar
Noise (Long-term)	Less than significant with mitigation	Similar	Less	Similar
Population and Housing	No impact	Similar	Less	Similar
Public Services	No impact	Similar	Less	Similar
Recreation	No impact	Similar	Less	Similar
Transportation	Less than significant with mitigation	Similar	Less	Similar
Tribal Cultural Resources	Less than significant	Similar	Less	Similar
Wildfire	Less than significant with mitigation	Similar	Less	Similar
Utilities and Service Systems	Less than significant	Similar	Less	Similar

Note: Although the alternatives may result in lesser or greater impacts compared with the proposed Project, the difference may be incremental and would not change the significance conclusion or requirement for mitigation.

4.2.1 No Project – Repowering by Others

Aesthetics

Under the No Project – Repowering by Others alternative, the proposed repowering would not occur as proposed by Sand Hill Wind LLC. Repowering in the future could result in the similar impacts related to aesthetics as the proposed Project, depending on turbine type, height, or specific location. Another project could result in a higher number of smaller individual turbines, for example, or different types on different portions of the Project site. Although the No Project – Repowering by Others alternative could also result in partial repowering of the site at one time, for consistency it is assumed that all portions of the site are repowered, in which case the aesthetic impacts would most likely be similar to the Project, or more adverse due to increased number or variety of turbines.

Agricultural and Forestry Resources

No important agricultural and forestry resources (i.e., Prime Farmland or Farmland of Statewide Importance) exist within the Project site, and Project lands under Williamson Act Contracts allow wind energy or repowering activities. For this reason, neither the Project as proposed nor another future repowering project would have impacts related to agricultural and forestry resources.

Air Quality

Emissions associated with this alternative would be similar to those under the proposed Project as construction activities would be required to restore and repower the site. Therefore, impacts on air quality under this alternative would be similar to those under the proposed Project.

Biological Resources

Because the No Project – Repowering by Others alternative would entail the same ground-disturbing activities, the effects on terrestrial biological resources would be similar to the proposed Project, but could occur at different times if the site were repowered in parts or phases over time. In addition, there is no reason to expect that repowering by others, whether at one time or in parts, would result in different avian mortality effects, if the generation of MWs is ultimately the same and uses fourth-generation wind turbines as described in the PEIR. However, a key objective of the proposed Project is the reduction of avian and bat fatalities through a unified monitoring protocol and a widespread mitigation, conservation and compensation program consistent with the PEIR. ~~Although any~~Any other wind company would be required to comply with mitigation measures identified in the PEIR, and provide generally similar monitoring and conservation measures, turbine-related avian and bat fatalities under the No Project – Repowering by Others alternative would likely be similar to the proposed Project.

Cultural Resources

Three cultural resources are present in the Project area. Because the area would be repowered in the foreseeable future by another wind company, the potential disruption to historic and archaeological resources associated with the alternative would be similar to that of the proposed Project. Therefore, the impacts on cultural resources under this alternative would be similar.

Energy

The Project would not obstruct state or local plans for renewable energy or energy efficiency because the Project entails installation of wind turbines that would increase available renewable energy and assist California in meeting its RPS, GHG reduction, and carbon neutrality goals. The No Project – Repowering by Others alternative would not further these goals in the short term, but it is anticipated that repowering would occur at some time in the future, resulting in a similar insignificant impact.

Geology, Soils, Mineral Resources, and Paleontological Resources

Under the No Project – Repowering by Others alternative, impacts would be similar to the proposed Project because the area would be repowered in the foreseeable future by another wind company. As with the proposed Project, other projects would be required to comply with existing regulatory requirements (building safety requirements), and would be required to comply with mitigation measures identified in the PEIR. With implementation of these measures to address seismic hazards and paleontological resources, the impact would be less than significant. Similar to the proposed Project, no septic system would be installed and no mineral resources would be affected. There would be no post-construction impacts or difference between the Project and the alternative.

Greenhouse Gas Emissions and Climate Change

The No Project – Repowering by Others alternative would generate short-term construction and operation-related emissions at the time that construction occurs. The annual GHG emissions reduction of approximately 50,000 metric tons of CO_2e associated with the proposed Project would also occur under this alternative, but could be delayed for an unknown number of years. Therefore, this alternative would have no impact on GHG emissions project in the short term. However, future repowering could have similar effects as the proposed Project, and would require similar mitigation measures.

Hazards and Hazardous Materials

The use of heavy equipment and potentially hazardous materials for future repowering could result in similar impacts to those identified for the proposed Project. Similar mitigation measures could be required.

Hydrology and Water Quality

The use of heavy equipment for future repowering could result in similar impacts to those identified for the proposed Project. Similar mitigation measures would be required.

Land Use and Planning

The proposed Project would have no impacts related to land use and planning. Because this alternative would result in the same uses in the same location, the impacts of this alternative would be the same as those of the proposed Project.

Noise

Construction and operation of future repowered turbines could result in similar impacts as for the proposed Project. Similar mitigation measures would be required.

Population and Housing

The proposed Project would have no impacts related to population and housing. Future construction and operation of repowered turbines at the Project site under this alternative would result in similar impacts as those of the proposed Project.

Public Services

The proposed Project would have no impacts related to public services. Future construction and operation of repowered turbines at the Project site under this alternative would result in similar impacts as those of the proposed Project.

Recreation

The proposed Project would have no impacts related to recreation. Future construction and operation of repowered turbines at the Project site under this alternative would result in impacts similar to those of the proposed Project.

Transportation

The alternative would generate no construction-related truck traffic in the foreseeable future, if not in the short term. The later construction and operation of repowered turbines at the Project site would result in similar impacts as those of the proposed Project. Similar mitigation measures would be required.

Tribal Cultural Resources

The proposed Project would not have significant impacts on tribal cultural resources. Construction and operation of repowered turbines at the Project site under this alternative would result in similar impacts as those of the proposed Project.

Utilities and Service Systems

The proposed Project would not have significant impacts related to utilities and service systems. Construction and operation of repowered turbines at the Project site under this alternative would result in similar impacts as those of the proposed Project.

Wildfire

Construction and operation of repowered turbines at the Project site under this alternative would result in similar impacts as those of the proposed Project. Similar mitigation measures would be required.

4.2.2 No Project – No Repowering

Aesthetics

Under the No Project – No Repowering alternative, the proposed repowering would not occur and the impacts of the proposed Project related to aesthetics would not occur.

Agricultural and Forestry Resources

No important agricultural and forestry resources occur in the Project site, and for this reason, the proposed Project would not have impacts related to agricultural and forestry resources. Similarly, no such impacts would occur under this alternative.

Air Quality

Because no repowering would occur on the site, impacts on air quality under this alternative would be less than those under the proposed Project.

Biological Resources

Because no new turbines would be installed, there would be a complete elimination of turbine-related avian and bat fatalities. Consequently, this alternative would have less severe impacts on biological resources than the proposed Project.

Cultural Resources

Because no new turbines would be installed, impacts on cultural resources under this alternative would be less than those under the proposed Project.

Energy

The No Project – No Repowering alternative would not serve state or local plans for renewable energy or energy efficiency in the way that the Project would. While the Project entails installation of wind turbines that would increase available renewable energy and assist California in meeting its RPS, GHG reduction, and carbon neutrality goals, the No Project – No Repowering alternative would not further these goals.

Geology, Soils, Mineral Resources, and Paleontological Resources

Because no new turbines would be installed, impacts for soil erosion and risk of harm to paleontological resources would be less than the proposed Project. Similar to the proposed Project, no septic system would be installed and no mineral resources would be affected. There would be no impact.

Greenhouse Gas Emissions and Climate Change

The annual GHG emissions reduction of approximately 50,000 metric tons of CO_2e would not occur under this alternative. Accordingly, this alternative would have greater impacts than the proposed Project.

Hazards and Hazardous Materials

Because no new turbines would be installed, the hazards and hazardous materials impacts of this alternative would be less than those of the proposed Project.

Hydrology and Water Quality

Because no new turbines would be installed, impacts related to hydrology and water quality under this alternative would be less than those under the proposed Project.

Land Use and Planning

No impacts would occur under this alternative.

Noise

Because no new turbines would be installed, noise levels are expected to be lower than ~~both~~ the proposed Project ~~and existing conditions~~.

Population and Housing

No impacts would occur under this alternative.

Public Services

No impacts would occur under this alternative.

Recreation

No impacts would occur under this alternative.

Transportation and Circulation

Because no new turbines would be installed, the impacts on transportation under this alternative would be less than those of the proposed Project.

Tribal Cultural Resources

No impacts would occur under this alternative.

Utilities and Service Systems

No impacts would occur under this alternative.

Wildfire

No impacts would occur under this alternative.

4.2.3 Smaller Turbine – Pre-Micro-Sited Layout

Aesthetics

The Smaller Turbine – Pre-Micro-Sited Layout alternative would vary slightly from the proposed Project, and due to the installation of smaller turbines, the impact of this alternative related to aesthetics could be slightly less or similar to those of the proposed Project. The same mitigation measures as identified for the proposed Project would be required for this alternative.

Agricultural and Forestry Resources

The proposed Project would have no impacts related to agricultural and forestry resources. This alternative would similarly have no impacts related to agricultural and forestry resources as these are related to Project site location.

Air Quality

This alternative would result in the same construction and operational air quality emissions as the proposed Project. Activities would still occur adjacent to sensitive receptors (i.e., residences). Accordingly, impacts related to air quality under this alternative would be similar to those under the proposed Project. The same mitigation measures as identified for the proposed Project would be required for this alternative.

Biological Resources

Surface disturbance under the Smaller Turbine – Pre-Micro-Sited Layout alternative would be similar to that of the proposed Project, therefore, the effects on terrestrial biological resources would be similar under this alternative.

However, the Smaller Turbine – Pre-Micro-Sited Layout alternative is expected to reduce avian and bat fatalities because ~~some~~roughly one half of the turbine locations would be adjusted based on the results of two micrositing studies and larger turbines would be replaced with smaller turbines with a smaller total rotor-swept area and, for most turbines, a greater rotor-to-ground clearance distance.

The Scientific Review Committee (SRC) for the APWRA has produced guidelines for siting wind turbines to reduce avian fatalities in the APWRA. The SRC evaluated topographic, wind pattern, bird behavior, and turbine siting variables related to hazardous conditions to provide guidance to the wind companies to reduce avian collision hazards (Alameda County Community Development Agency 2014). These siting guidelines have been further adapted in two studies used to develop micro-siting recommendations for the Sand Hills Project area. In the first study, Smallwood and Neher (2018) developed map-based avian collision hazard models based on a detailed digital elevation model of the APWRA, along with data on raptor behavior within the APWRA that were collected by field observers and by GPS tracking of a test group of golden eagles. These data were used to develop quantitative Fuzzy Logic models intended to "predict the locations where golden eagles, red-tailed hawks, American kestrels and burrowing owls are most likely to perform flight behaviors putting these species at greater risk of collision with wind turbines, so that new wind turbines can be sited to avoid these locations" (Smallwood and Neher 2018: 3). These models were sufficiently informative to support relocation of a number of turbines. However, Smallwood and

Neher also advise "It is important to remember that the models are most effectively used as foils against expert judgement." Accordingly, Estep (2019) provided further guidance, using professional judgement based on long experience in the APWRA to assess, after field visits to each turbine site, each site's relative risk for avian collision. Estep's recommendations generally agreed with those of Smallwood and Neher (2018), but in many cases were more precise regarding where and why to relocate turbines, and in a few cases Estep identified relocation of turbines that were not identified as hazardous in the Fuzzy Logic models. In general, though, the studies by Smallwood and Neher (2018) and Estep (2019) concurred in the relative risk determination for each turbine site, despite using entirely different assessment methods.

In total, the Smaller Turbine – Pre-Micro-Sited Layout responds to the two micrositing studies by relocating ~~19~~17 of the proposed Project's 40 turbines, reducing overall Project capacity by 24% from 144.5 MW to 109.5 MW, reducing rotor-swept area by 13%, from 568,775 m^2 to 496,220 m^2, and raising the average clearance of turbine blades by 75%, from 14.1 m to 24.7 m above the ground. It follows an expert micro-siting recommendation at 24 turbine sites; uses a partial, modified, or secondary recommendation at five additional sites where the full recommendation could not be feasibly implemented; and reduces the turbine size at 10 of the 11 locations where turbines could not be relocated due to setback or other physical constraints. Each of these steps is expected to reduce bird and bat mortality based on input obtained from two micro-siting studies. For example, while Estep (2019) designated 13 pre-micro-siting turbine locations as relatively high risk, the Smaller Turbine – Pre-Micro-Sited Layout alternative retains only seven such sites due to setback and wake effect constraints, moving the others to safer locations. Impact reduction would also be achieved by reducing Project capacity and reducing rotor-swept area (the two are highly correlated). Clearance distance increases from 14.1 m to 24.7 m are expected to reduce fatality rates as well. Although the micrositing studies that informed the Smaller Turbine – Pre-Micro-Sited Layout focused on raptors rather than non-raptor birds and bats, the Project's reduced capacity would be expected to reduce fatalities for both groups.

Consequently, this alternative would have less severe impacts on biological resources than the proposed Project. The same mitigation measures as identified for the proposed Project would be required for this alternative.

Cultural Resources

The Smaller Turbine – Pre-Micro-Sited Layout alternative would vary slightly from the proposed Project, in that turbines could be located in different locations. However, the alternative would result in the same number of turbines and a similar amount of disturbance. For this reason, this alternative, the likelihood of encountering a cultural resource during installation activities is similar to that under the proposed Project. Therefore, the impacts on cultural resources under this alternative would be similar to those under the proposed Project. The same mitigation measures as identified for the proposed Project would be required for this alternative.

Energy

The Project would not obstruct state or local plans for renewable energy or energy efficiency because the Project entails installation of wind turbines that would increase available renewable energy and assist California in meeting its RPS, GHG reduction, and carbon neutrality goals. The Smaller Turbine – Pre-Micro-Sited Layout alternative would provide similar benefits to the proposed Project, and impacts would be similar.

Geology, Soils, Mineral Resources, and Paleontological Resources

Under the Smaller Turbine – Pre-Micro-Sited Layout alternative, the same number of turbines would be installed. The seismic conditions would be the same as the proposed Project and building safety requirements and mitigation measures would also be the same, so the impacts related to surface fault rupture, strong ground shaking, or seismically induced ground failure would be the same. For soil erosion and paleontological resources, the impacts would be similar to the proposed Project. Because the impacts would be similar and because a SWPPP and the same mitigation measures as identified for the proposed Project would be required the impacts would be similar to the proposed Project. Like the proposed Project, no septic system would be installed, and no mineral resources would be affected and for these issues there would be no impact. Overall impacts would be similar to those of the proposed Project.

Greenhouse Gas Emissions and Climate Change

This alternative would result in the same construction and operational GHG emissions as the proposed Project. Consequently, impacts related to GHG emissions under this alternative would be similar to those under the proposed Project, although less renewable electricity would be produced due to the use of smaller turbines. The same mitigation measures as identified for the proposed Project would be required for this alternative.

Hazards and Hazardous Materials

This alternative would result in the same types of uses in the same area. The impacts would be similar to those of the proposed Project. The same mitigation measures as identified for the proposed Project would be required for this alternative.

Hydrology and Water Quality

This alternative would result in the same construction and operational hydrology and water quality impacts as the proposed Project. The potential for construction activities to result in increased erosion and discharge of sediment to surface waters would be similar to the proposed Project. New turbines being placed in areas that would impede existing drainage patterns would also be similar to the proposed Project. Consequently, impacts on hydrology and water quality under this alternative would be similar to those under the proposed Project. The same mitigation measures as identified for the proposed Project would be required for this alternative.

Land Use and Planning

The proposed Project would have no impacts related to land use and planning. Because this alternative would result in the same uses in basically the same location, the impacts of this alternative would be the same as those of the proposed Project.

Noise

This alternative would result in construction noise similar to the proposed Project. Construction activities would still occur adjacent to sensitive receptors (i.e., residences). Noise levels from operation under this alternative would depend on siting and acoustic specification of individual turbines. Accordingly, impacts related to wind turbine noise under this alternative may be similar, or potentially higher compared to the proposed Project. The same mitigation measures as identified for the proposed Project would be required for this alternative.

Population and Housing

The proposed Project would have no impacts related to population and housing. Because this alternative would result in construction and operation of a similar project in basically the same location, the impacts of this alternative would be the same as those of the proposed Project.

Public Services

The proposed Project would have no impacts related to public services. Because this alternative would result ~~in~~ in construction and operation of a similar project in basically the same location, the impacts of this alternative would be the same as those of the proposed Project.

Recreation

The proposed Project would have no impacts related to recreation. Because this alternative would result in the same uses in basically the same location, the impacts of this alternative would be the same as those of the proposed Project.

Transportation and Circulation

Under this alternative, the same number of turbines as under the proposed Project would be constructed, but they would be placed on different locations within the Project area. Because equipment and construction activities would be similar to those of the proposed Project, the alternative would neither reduce nor increase impacts on transportation. Impacts on transportation under this alternative would be similar to those of the proposed Project. The same mitigation measures as identified for the proposed Project would be required for this alternative.

Tribal Cultural Resources

The proposed Project would not have significant impacts on tribal cultural resources. Under this alternative, the same number of turbines as under the proposed Project would be constructed, but they would be placed on different locations within the Project area. The impacts of this alternative would be similar to those of the proposed Project.

Utilities and Service Systems

The proposed Project would not have significant impacts related to utilities and service systems. Because this alternative would result in the same uses in basically the same location, the impacts of this alternative would be the same as those of the proposed Project.

Wildfire

Under this alternative, the same number of turbines as under the proposed Project would be constructed, but they would be placed on different locations within the Project area. Because equipment and construction activities would be similar to those of the proposed Project, the alternative would neither reduce nor increase impacts related to wildfire. Impacts related to wildfire under this alternative would be similar to those of the proposed Project. The same mitigation measures as identified for the proposed Project would be required for this alternative.

4.3 Environmentally Superior Alternative

The State CEQA Guidelines require that an environmentally superior alternative be identified. The environmentally superior alternative is the alternative that would avoid or substantially lessen, to the greatest extent, the environmental impacts associated with the Project while feasibly attaining most of the major Project objectives. If the alternative with the least environmental impact is determined to be the no project alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives.

The identification of the environmentally superior alternative results from a comparison of the impacts associated with each alternative to those of the proposed Project, as shown in Table 4-1. The No Project – No Repowering alternative is the environmentally superior alternative because it would not allow repowering of the Project site. However, the No Project – No Repowering alternative is infeasible because it achieves none of the proposed Project's objectives. CEQA Guidelines Section 15126.6 (e) (2) requires that, if the no project alternative is the environmentally superior alternative, another alternative must be identified that is the environmentally superior alternative.

As discussed above, the Smaller Turbine – Pre-Micro-Sited Layout alternative would result in a reduction in impacts related to biological resources relative to the proposed Project and the No Project – Repowering by Others alternative, and would not result in greater impacts than the proposed Project in other areas. The Smaller Turbine – Pre-Micro-Sited Layout alternative is the only feasible environmentally superior alternative because it achieves most of the objectives of the proposed Project while substantially reducing its significant and unavoidable biological resources impacts.

4.4 References Cited

Printed References

Estep. 2019. Assessment of proposed wind turbine sites to minimize raptor collisions at the Sand Hill Wind Repowering Project in the Altamont Pass Wind Resource Area. Prepared for ICF International and sPower. March.

Smallwood, K. Shawn, and L. Neher. 2018. Siting wind turbines to minimize raptor collisions at Sand Hill Repowering Project, Altamont Pass Wind Resource Area. August 10. Unpublished mss.

Chapter 5
Other CEQA Considerations

5.1 Overview

This chapter contains discussions and analyses of the following topics, as required by the California Environmental Quality Act (CEQA).

- Cumulative impacts.
- Growth-inducing impacts.
- Significant and unavoidable environmental impacts.
- Significant irreversible environmental impacts.

5.2 Cumulative Impacts

5.2.1 Approach to Impact Analysis

Legal Requirements

State CEQA Guidelines require that the cumulative impacts of a project be addressed in an EIR when the cumulative impacts are expected to be significant and when the project's incremental effect is cumulatively considerable (State CEQA Guidelines Section 15130[a]). Cumulative impacts are impacts on the environment that result from the incremental impacts of a proposed action when added to other past, present, and reasonably foreseeable future actions (State CEQA Guidelines Section 15355[b]). Such impacts can result from individually minor but collectively significant actions taking place over time.

Section 15130 of the State CEQA Guidelines states that the discussion of cumulative impacts need not provide as much detail as the discussion of effects attributable to the project alone. The level of detail should be guided by what is practical and reasonable.

PEIR Cumulative Impact Background

PEIR Sections 5.4.1 and 5.4.2 provided a detailed description of the cumulative background for the cumulative impacts analysis, including a topic-by-topic description of the cumulative background. This section describes that the PEIR used "a combination of the plan/projections and list approaches, using the land use designations of the ECAP in combination with known other relevant projects in the APWRA area" and is incorporated herein by reference. Wind energy repowering in the program area since the PEIR was certified include the following projects, three of which were anticipated in the PEIR, and the fourth, Rooney Ranch, was among the sites that were considered by the County for repowering in 1998. These projects are described in more detail in Table 2-6. *Operational, Approved, or Foreseeable Projects in the APWRA.* For this reason, the cumulative background analysis used in the PEIR has not substantially changed since the adoption of the PEIR.

Approved Repowering Projects Since 2014

- Golden Hills North
- Summit Wind
- Rooney Ranch

5.2.2 Analysis of Cumulative Impacts

PEIR Cumulative Impact Analysis

PEIR Section 5.4.2 provided a detailed description of the cumulative impacts of the implementation of the program. The conclusions of this section are that the program would make a cumulatively considerable contribution to cumulative impacts as listed below. The analysis in Section 5.4.2 of the PEIR is incorporated here by reference. One change to the PEIR cumulative impacts analysis is that there are now 479.3 MW of reasonably foreseeable wind power development in the APWRA, whereas the PEIR analysis considered a potential of no more than 450 MW. This change is due to a change in the number and size of foreseeable future developments.[1] This represents a 6.4% increase in potential development compared to the PEIR, and this analysis considers the effects of that increase, relative to the impacts assessed in the PEIR.

Topics for which the PEIR Concluded there would be No Cumulative Impact

Because the program and projects would not result in any impacts in the following areas, it would not result in or contribute to a cumulatively considerable effect in the following areas.

- Land Use and Planning
- Geology, Soils, and Mineral Resources
- Hydrology and Water Quality
- Population and Housing
- Public Services
- Recreation
- Utilities and Service Systems

Topics for which the PEIR Concluded the Program would Not Contribute to a Cumulative Impact

The PEIR concluded that the program would not contribute to a cumulative impact in the following topics for the reasons discussed in PEIR Section 5.4.2 and summarized below:

[1] As shown in Table 2-6 in Chapter 2, Project Description, additional applications for new or expanded wind power development (Mulqueeny Ranch and Summit Wind) have been received by the County subsequent to certification of the PEIR. Additionally, Diablo Winds is considered herein to be a contributor to the total MW of wind development within the APWRA for the purposes of the cumulative impacts analysis, but was not included in the 450 MW total analyzed in the PEIR.

Aesthetics

The geographic scope considered for potential cumulative impacts on visual/aesthetic resources is the viewshed of the public and recreational users common to the program area. Within the viewshed of the program area and project sites, the Vasco Wind project, in combination with the proposed program and projects, could contribute to cumulative impacts on visual/aesthetic resources. The Vasco Wind Repowering Project could affect views from Vasco Road, which is a County-designated scenic route where no turbines currently exist in Alameda County. A portion of Vasco Road is located in the northwestern corner of the program area boundary. Therefore, the proposed program could contribute to a cumulatively considerable impact on this County-designated scenic route. However, existing Alameda and Contra Costa County policies would prevent the program from contributing to a cumulatively significant impact. When considered with the Vasco Wind Repowering Project, the PEIR concluded that the program could contribute to a cumulatively considerable impact on visual character where no turbines exist near the northern boundary of the program area but that Alameda County Policy ECAP 105, together with Mitigation Measures AES-2a, AES-2b, AES-c, AES-3, and AES-5, would prevent the proposed program from contributing to a cumulatively considerable impact. In addition, the PEIR concluded that cumulative impacts on daytime and nighttime views resulting from light and glare would be less than significant for the proposed program through compliance with existing Alameda County policies and measures included in the program, and cumulative impacts on daytime and nighttime views for the Vasco Winds Repowering Project would be reduced to a less-than-significant level with implementation of Mitigation Measure AES-5. Therefore, the PEIR concluded that the program would not result in a cumulatively considerable impact because the combined impacts of the two projects would not create a new source of light, glare, or shadow flicker experienced by residents and businesses of sufficient magnitude that day or nighttime views in the area would be substantially degraded. Increasing the potential development of the APWRA from 450 MW to 479.3 MW would not alter this determination, since the same rationale, and the same minimization and mitigation requirements would still apply.

Agricultural and Forestry Resources

The program area contains 24.21 acres of Prime Farmland and 0.36 acre of Farmland of Statewide Importance. PEIR Mitigation Measure AG-1 would ensure that no Prime Farmland or Farmland of Statewide Importance is converted to nonagricultural use. Because the program would not result in any impacts on farmland or forestry resources, it would not result in or contribute to a cumulatively considerable impact. Increasing the potential development of the APWRA from 450 MW to 479.3 MW would not alter this determination, since the same mitigation requirement would still apply.

Biological Resources

~~The analysis of cumulative impacts on biological resources was carried out at two geographic scales.~~ Construction-related impacts, which would largely pertain to disturbance and potential loss of land cover types and the associated effects on special-status terrestrial species, were considered in the context of the northern Diablo Range. Cumulative impacts associated with avian and bat fatalities through turbine collision were considered in the context of the entire APWRA (both Alameda and Contra Costa Counties) as well as the Montezuma Hills Wind Resource Area in Solano County. Implementation of either program alternative could result in the permanent loss of vegetation and wetlands. Compensation for the loss of vegetation and wetlands would mitigate those impacts with the goal of no net loss. It is expected that each project implemented under the program would be required to mitigate losses of vegetation and wetlands, resulting in no net loss, and thereby reducing any contribution to cumulative impacts to a less-than significant level. Increasing the potential development of the APWRA from 450 MW to 479.3 MW would not alter this determination, since the same compensatory mitigation requirements would still apply.

Implementation of the program could result in the injury, mortality, or disturbance of special-status and common wildlife species during construction, with the potential to affect local populations. Implementation of mitigation measures identified in the PEIR would minimize or avoid injury, mortality, or disturbance of special-status and common species during construction, and would avoid or reduce the program's contribution to cumulative effects on local populations. The program would result in the permanent and temporary losses of land cover types that provide suitable habitat for special-status and common wildlife species. The loss of these habitats would contribute to impacts of other projects that remove these habitats in the program region. However, permanent disturbance of undeveloped land would be offset by restoration of habitat when existing roads and turbine pads and foundations are restored to natural conditions. With this offset, and with implementation of mitigation measures identified in the PEIR that require restoration of temporarily affected habitat and compensation for the permanent loss of habitat, the program's contribution to certain cumulative impacts on habitats and terrestrial species would be reduced. Increasing the potential development of the APWRA from 450 MW to 479.3 MW would not alter this determination, since the same mitigation requirements would still apply.

Cultural Resources

Simultaneous construction of multiple repowering projects in the program area and other development and infrastructure projects in the vicinity of the program area could potentially result in significant impacts on historic resources, archaeological resources, and human remains, should they be present within the program area or the vicinity of the program area. However, implementation of mitigation measures identified in the PEIR will ensure that impacts would not be such that they would result in or contribute to a cumulative impact. Increasing the potential development of the APWRA from 450 MW to 479.3 MW would not alter this determination, since the same mitigation requirements would still apply.

Paleontological Resources

Simultaneous construction of multiple repowering projects in the program area and other development and infrastructure projects in the vicinity of the program area could potentially result in significant impacts on paleontological resources, should they be present within the program area or the vicinity of the program area. However, implementation of the mitigation measures to protect paleontological resources identified in the PEIR will ensure that impacts would not be such that they would result in or contribute to a cumulative impact. Increasing the potential development of the APWRA from 450 MW to 479.3 MW would not alter this determination, since the same mitigation requirements would still apply.

Greenhouse Gas Emissions

GHG emissions are inherently a cumulative concern, in that the significance of GHG emissions is determined based on whether such emissions would have a cumulatively considerable impact on global climate change. Although the geographic scope of cumulative impacts related to GHG emissions is global, this analysis focuses on the state, the region, and the program's direct and/or indirect generation or offset of GHG emissions. The program, the Golden Hills Project, and the

Patterson Pass Project would result in a long-term net reduction of approximately 96,049 metric tons of CO2e per year, 18,727 metric tons of CO2e per year, and 6,204 metric tons of CO2e per year, respectively, and would not conflict with the State's GHG reduction goals. Therefore, the project-specific incremental impact on GHG emissions resulting from the program or from either of the two projects would not be cumulatively considerable. By the same rationale, increasing the potential development of the APWRA from 450 MW to 479.3 MW would not alter this determination.

Hazards and Hazardous Materials

Potential cumulative hazards and hazardous materials impacts are generally site-specific and depend on past, present, and future uses and existing soil, sediment, and conditions. The geographic scope of potential cumulative impacts relating to wildland fires includes the high fire hazard areas in which access and haul roads would be shared throughout the APWRA and other projects being constructed at the same time. The background for the cumulative analysis includes~~d~~ the following existing windfarms ~~including~~: Golden Hills Project, Patterson Pass, Summit, AWI, Vasco, FloDesign Wind Turbine Corp,~~. These projects, together with the existing old-generation windfarm facilities and~~ the proposed Mariposa Energy Center and Cool Earth Solar Energy Facility near Mountain House. The project would contribute less-than-significant impacts related to accidental releases of hazardous materials; interference with air navigation; or flammable or combustible materials. There is no evidence of existing subsurface conditions that would potentially contribute to cumulative impacts relating to hazards and hazardous materials. No records exist indicating that contaminated sites or hazardous substances are located in areas to be disturbed. The program and all cumulative projects would be required to adhere to regulations that govern hazardous materials storage and handling, water quality BMPs, FAA regulations related to airspace, and fire prevention and management. Together, these measures would ensure that impacts related to exposure to hazardous materials would be minimized and/or avoided. Therefore, the project's incremental, less-than-significant impacts in these areas would not be cumulatively considerable. Increasing the potential development of the APWRA from 450 MW to 479.3 MW would not alter this determination, since the same regulatory requirements would still apply.

Noise

The modern turbines are expected to have several characteristics that reduce aerodynamic sound levels and make for quieter operations than the existing turbines. The modern turbines are expected to have relatively low rotational speeds and pitch control on the rotors, both of which reduce sound levels. Nonetheless, the analysis provided above at both the program and project level indicates that there is potential for repowering projects to result in noise that exceeds County noise standards which would result in significant cumulative operational noise impacts. Implementation of PEIR Mitigation Measure NOI-1, however, would ensure compliance with County noise standards and would avoid significant cumulative operational noise impacts. Construction of multiple repowering projects simultaneously in the program area could potentially result in a cumulative construction noise impact at residences located near the construction activities. However, the impact would be temporary and localized and implementation of PEIR Mitigation Measure NOI-2 would reduce cumulative impacts to a less-than-significant level. Increasing the potential development of the APWRA from 450 MW to 479.3 MW would not alter this determination, since the same mitigation requirements would still apply.

Topics for which the PEIR Concluded the Program would Make a Cumulatively Considerable Contribution to a Cumulative Impact

Air Quality

Construction emissions of ROG and NO_X for the program are greater than the BAAQMD thresholds after the implementation of PEIR Mitigation Measures AQ-~~1~~2a and AQ-2b, ~~(Table 3.3-11 of the PEIR)~~, and therefore cumulative construction impacts are significant and unavoidable. Increasing the potential development of the APWRA from 450 MW to 479.3 MW would not alter this determination, since the same type and level of construction activities would still occur, and the same mitigation measure, as well as the 2019 NEW Mitigation Measure AQ-2c included in SEIR Section 3.3, Air Quality, would be required to mitigate for, or offset, construction-related emissions of ROG and NO_X, and the impact would not be substantially increased with the increase in capacity.

Biological Resources

Avian and bat mortality associated with turbine collisions has been identified as a significant and unavoidable impact. By definition, and considered with other sources of avian mortality (e.g., the Contra Costa County portion of the APWRA and the neighboring Montezuma Hills Wind WRA), this would constitute a considerable contribution to a significant cumulative impact. To provide further context for this determination beyond what is described in the PEIR and to reflect the increase in total capacity within the APWRA, updated cumulative data, including recent data on population status of all bird species evaluated in Chapter 3, is considered here, using species population estimates for Bird Conservation Region (BCR) 32 derived from the Partners in Flight (2020) Population Estimates Database. BCR 32 encompasses the coastal slope and Coast Ranges of central and southern California and the Central Valley, and is the planning unit used by USFWS for most of their bird conservation assessments in California.

Table 5-1 shows the range of estimated bird fatalities for the APWRA using the cumulative effects analysis presented in the PEIR, as recalculated using more current monitoring data, as was done in the impact analysis (Chapter 3). As shown here, the change in fatality rates matches the 6.4% capacity increase that would result from a 479.3 MW instead of a 450 MW capacity limit for repowering projects in the APWRA. Within BCR 32, the total fatalities would be a small fraction of the population, and thus would have negligible potential to affect population status for all species except the burrowing owl, golden eagle, and tricolored blackbird.

Table 5-1. Estimated Annual Bird and Bat Fatalities for APWRA

Species	APWRA Average Estimate (450 MW)[a]	APWRA Weighted Average Estimate (450 MW)[a]	APWRA Average Estimate[b] (479.3 MW)	APWRA Weighted Average Estimate[b] (479.3 MW)	Population Estimate[c] (thousands)	Annual Percentage Loss[d]
American kestrel	78	75	83	80	61/110/190	0.07%–0.08%
Barn owl	11	9	11	10	2/19/53	0.05%–0.06%
Burrowing owl	165	175	176	187	1.7/9.7/24	1.82%–1.93%
Golden eagle	27	22	29	24	See text	See text
Loggerhead shrike	5	4	5	4	82/160/280	Less than 0.01%
Prairie falcon	3	2	3	2	0.6/2.4/5.3	0.10%–0.13%
Red-tailed hawk	129	113	138	120	89/150/240	0.08%–0.09%
Swainson's hawk	0	0	0	0	12/41/89	0%
Tricolored blackbird	7	3	8	3	See text	See text
All raptors[e]	439	419	467	446	541/1,010/1,760	0.04%–0.05%
Mexican free-tailed bat	784	1,400	834	1,490	See text	See text
Hoary bat	421	1,040	448	1,106	See text	See text
All bats	1,339	2,538	1,425	2,702	See text	See text

[a] APWRA-wide fatality estimates are based on a proposed capacity of 450 MW. Estimates are not the same as the fatalities presented in the PEIR (Alameda County Community Development Agency 2014), which were calculated using older monitoring results. Minimum and maximum estimates are calculated as described in note (b).

[b] Minimum and maximum estimates are based upon the mean value of the fatality rates for the four repowering projects in Table 3.4-8, which were used to generate two mean values. One is the mean of the average fatality rates for each project, and the other is the mean of the average fatality rates as weighted according to the number of years of monitoring performed at each project (2 to 4 years).

[c] for most birds, the mean estimate and 95% confidence interval range for the population of each species within BCR 32 Partners in Flight (2020).

[d] Calculated as the 479.3 MW maximum estimate divided by the BCR 32 average estimate.

[e] "All raptors" includes birds belonging to the Accipitriformes, Falconiformes, and Strigiformes that have previously been identified as fatalities in the APWRA, as inventoried by ICF (2016).

The burrowing owl suffers mortality at highly varying rates through the APWRA because of extremely variable habitat quality in the area. It is likely that fatalities would approximate the average of low and high fatality rates shown, i.e. on the order of 180 birds per year, which would represent the annual loss of close to 2% of the BCR 32 population. This is likely an overestimate. The PEIR noted on page 3.4-105 that "A growing body of circumstantial evidence indicates that many of the burrowing owl fatalities found during fatality surveys are due to predation rather than turbine collision." Also, as H. T. Harvey & Associates (2018b) noted in their recent monitoring report for the Golden Hills project "the fact that 84 percent of the Year 2 burrowing owl fatalities were found as feather spots or carcass remnants, mostly around burrows and along erosion-control wattles, suggests that predation was the primary cause of fatalities for this species." In light of this evidence, it seems likely that a large fraction of observed burrowing owl fatalities are not caused by wind development, and that fatalities due to wind development have little potential to alter population status.

The golden eagle fatality rate is substantial, but has little potential to exceed population productivity within the Diablo Range, which is the principal source for eagles experiencing mortality within the APWRA. This situation and its implications for the golden eagle population are detailed below in the assessment of project-scale cumulative impacts. These conclusions hold true for the APWRA as a whole under a 479.3 MW development scenario.

Meese (2014) provide an estimate of the statewide tricolored blackbird population of 145,000 birds. However, he also notes that in 2014 the estimate for Alameda, Contra Costa, and Solano counties, combined (i.e., the cumulative impacts analysis area), was 660 birds. The 479.3 MW development scenario would have the potential to remove approximately 9 to 19 birds per year from this population, or 1.3% to 2.9% of the population. This small removal has little potential to substantially reduce the species' prospects for continued viability within these counties.

The bat fatality rate is substantial, at least to the extent that it affects migratory bats, especially the hoary bat. This situation and its implications for bat populations is detailed below in the assessment of project-scale cumulative impacts. Those conclusions hold true for the APWRA as a whole under a 479.3 MW development scenario.

This analysis confirms the PEIR determination of significant and unavoidable impact on both birds and bats, to which the contribution of the proposed program would be cumulatively considerable, however there is no evidence of a substantial change in the magnitude of the cumulative impact, relative to the analysis in the PEIR.

Transportation

The PEIR concluded that any proposed repowering projects with the construction activities taking place concurrently with construction of a repowering project at the location of the Sand Hill project site would contribute to a significant and unavoidable cumulative impact on traffic operation, safety hazards, emergency access, and bicycle facilities on the roadway and bicycle facilities in the vicinity. Increasing the potential development of the APWRA from 450 MW to 479.3 MW would not alter this determination, since the same type of impacts would still occur, with a moderate (6.4%) increase in development as compared to the total of 450 MW considered in the PEIR.

Sand Hill Project Cumulative Impact Analysis

Cumulative Impacts identified in the PEIR

In this section, the cumulative impacts identified in the PEIR were examined to determine whether the Project would make a cumulatively considerable contribution to those impacts.

Aesthetics

The geographic scope considered for potential cumulative impacts on visual/aesthetic resources is the viewshed of the public and recreational users common to the program area. The PEIR concluded that the program would not make a cumulatively considerable contribution to cumulative aesthetics impacts for the following reasons, which also apply to the Sand Hill Project.

Existing Alameda and Contra Costa County policies would prevent the program from contributing to a cumulatively significant impact. Alameda County Policy ECAP 105, together with Mitigation Measures AES-2a, AES-2b, AES-c, AES-3, and AES-5, would prevent the proposed program from contributing to a cumulatively considerable impact.

Agricultural and Forestry Resources

The program area contains 24.21 acres of Prime Farmland and 0.36 acre of Farmland of Statewide Importance. PEIR Mitigation Measure AG-1 would ensure that no Prime Farmland or Farmland of Statewide Importance is converted to nonagricultural use. This measure would also apply to the Project, and would ensure that the project would not result in any impacts on farmland or forestry resources, and therefore would not result in or contribute to a cumulatively considerable impact.

Air Quality

Construction of the Sand Hill Project would generate reactive organic gases (ROG) and nitrogen oxides (NO_X). Although the Project impact related to ROG would be less than significant (Impact AQ 2), and the Project impact related to NOx would be less than significant with mitigation (Impact AQ-2, PEIR Mitigation Measures AQ-2a and AQ-2b and 2019 Mitigation Measure AQ-2d), the ROG and NO_X generated by the project would contribute to the cumulative impact identified in the PEIR. Because the amounts of ROG and NO_X would be substantial, the contribution would be cumulatively considerable.

Biological Resources

Avian and bat mortality associated with turbine collisions has been identified as a significant and unavoidable impact. By definition, and considered with other sources of avian mortality (e.g., the Contra Costa County portion of the APWRA and the neighboring Montezuma Hills Wind WRA), this would constitute a considerable contribution to a significant cumulative impact. While the conclusions in the SEIR (as incorporated from the PEIR) regarding cumulative impacts on avian and bat species remains the same, additional information related to golden eagle and bat mortality has become available since certification of the PEIR, and have been incorporated into the analysis of the project's contribution to this cumulative impact.

Golden Eagles

The golden eagle within the APWRA has been the subject of extensive field studies and modeling to ascertain its population status and its likely long-term responses to fatalities caused by wind energy developments. This work was synthesized by Hunt et al. (2017), who estimated that an annual reproductive output of 216–255 breeding pairs would have been necessary to support published estimates of 55–65 turbine-caused fatalities per year in the APWRA, concluding that the area has "a stable breeding population, but one for which any further decrease in vital rates would require immigrant floaters [subadults and nonbreeding adults] to fill territory vacancies." This estimate would indicate that the 280 territorial pairs present in the Diablo Range (Wiens et al. 2015) would likely be adequate to maintain the region's golden eagle population, but with a long-term population reduction possible if fatalities were to exceed 55–65 eagles per year.

There are substantial uncertainties in this conclusion, however. USFWS (Letter 9, Appendix E, notes, for instance, that the severe drought that affected the Diablo Range during 2014-2016 monitoring resulted in average annual productivity of approximately half of that assumed by Hunt et al. (2017), indicating that during times of low productivity a much larger population would be needed to achieve a stable population size under the stress of wind project mortality. Also, Hunt et al. (2017) assumes that the Diablo Range eagles are a discrete population, but they acknowledge that up to 17% of radio transmitter-tagged eagles used in their study left the Diablo Range area or may have originated outside the area and migrated in. These “travelers” are predominately juvenile, subadult, or nonbreeding adult eagles, a group that also comprises a disproportionate fraction of the golden eagle mortalities in the APWRA. Thus, the eagles in the APWRA make up an anomalously small fraction of the reproductive eagles in the Diablo Range, as well as an anomalously large fraction of those eagles most likely to have come from or be migrant to areas outside the Diablo Range. It is also noteworthy that golden eagle fatalities attributable to wind energy development in the cumulative context would remain substantially lower than 55–65 eagles per year, with estimated fatalities of 10.2 eagles per year for the Montezuma Hills Wind Resource Area (ICF 2010) and 35.2 eagles per year for the APWRA (based on 0.06 eagles/year/MW with 587 MW of installed capacity, which includes the proposed project), totaling 45.4 eagles per year.

For these reasons, the expectation is that the Diablo Range population could support a substantial further increase in eagle fatalities before experiencing a substantial change in population demographics. The new data confirm the PEIR determination of a significant and unavoidable cumulative impact on golden eagles to which the contribution of the proposed project would be cumulatively considerable; however, the data provides no evidence of a substantial change in the magnitude of the cumulative impact, relative to the conclusions in the PEIR.

Bats

The primary bats affected by wind energy development in the APWRA are Mexican free-tailed and hoary bats, which together account for more than 90% of the bat fatalities observed in Vasco Winds and Golden Hills monitoring; the two species make up approximately equal fractions of the observed mortality. The Mexican free-tailed bat is not a species of conservation concern, as it is extremely widespread and in most of its range is non-migratory (the species makes local movements or short migrations altitudinally). The hoary bat, however, is highly migratory, with a summer range that includes much of North America, and seasonal migrations to overwinter in southern California and Mexico (Cryan 2003). The species was early identified as the single most common bat fatality at wind farms at locations throughout the United States (Ellison 2012), both because it is a “tree bat” that is known to be attracted to forage at wind turbines (Arnett et al. 2016), and because it is highly migratory. Migrations in this species are not well understood, but at least some populations make very long migrations (Cryan et al. 2014). California is geographically positioned between hoary bat populations in western Canada and the Pacific Northwest, and overwintering habitat in southern California and Mexico. Most hoary bat fatalities detected in the APWRA have occurred in the fall, during the southward bat migration, so it is likely that most hoary bat fatalities in the area involve migratory rather than resident bats, and this may also indicate that their spring migration has less exposure in the APWRA. It is thus likely that many of the fatalities observed at APWRA are derived from a large migratory population that summers north of the area.

More recent studies shed additional light on cumulative impacts on hoary bats. Frick et al. (2017) developed population models of hoary bats in North America and showed that, due to high mortality rates and low reproductive rates, continuation of current mortality rates associated with wind power facilities could "pose a substantial threat to migratory bats in North America," with possible outcomes for the hoary bat including local extirpation. Data corroborating this proposition have been published by Rodhouse et al. (2019), who find evidence for region-wide summer declines of hoary bats in the Pacific Northwest (Washington and Oregon) between 2010 and 2018; they propose "the hypothesis that the longer duration and greater geographic extent of the wind energy stressor (collision and barotrauma) have impacted the species." It is thus possible that wind energy development in the APWRA, alone or in concert with the proposed Project, could cause or contribute to declines in regional hoary bat populations. This does not alter, but rather confirms and adds further detail to the PEIR determination of a significant and unavoidable cumulative impact on bats. As discussed in analysis of Impact BIO-14, this analysis also finds that the number of bats likely to be killed by wind turbines is greater than was estimated in the PEIR. However, in the absence of any confident estimate of the size of the affected bat populations, it is not possible to conclude with confidence that the impact would be greater than as assessed in the PEIR analysis, as the PEIR itself anticipated when it acknowledged its estimates were uncertain and likely understated the actual effect (see, e.g., PEIR, 3.4-58, 3.4-133). This analysis confirms the PEIR determination of significant and unavoidable impact on bats to which the contribution of the proposed project would be cumulatively considerable, however there is no evidence of a substantial change in the magnitude of the cumulative impact, relative to the analysis in the PEIR.

~~Construction of the Sand Hill Project would result in significant and unavoidable impacts related to avian and bat mortality. The Project would, therefore, make a cumulatively considerable contribution to the cumulative impact identified in the PEIR.~~

Cultural Resources

Simultaneous construction of multiple repowering projects in the program area and other development and infrastructure projects in the vicinity of the program area could potentially result in significant impacts on historic resources, archaeological resources, and human remains, should they be present within the program area or the vicinity of the program area. However, the PEIR found that implementation of mitigation measures identified in the PEIR will ensure that impacts would not be such that they would result in or contribute to a cumulative impact. These measures also apply to the project, and therefore, the project impacts would not be such that they would result in or contribute to a cumulative impact.

Paleontological Resources

Simultaneous construction of multiple repowering projects in the program area and other development and infrastructure projects in the vicinity of the program area could potentially result in significant impacts on paleontological resources, should they be present within the program area or the vicinity of the program area. However, the PEIR found that implementation of mitigation measures identified in the PEIR will ensure that impacts would not be such that they would result in or contribute to a cumulative impact. These measures also apply to the project, and therefore, the project impacts would not be such that they would result in or contribute to a cumulative impact.

Greenhouse Gas Emissions

GHG emissions are inherently a cumulative concern, in that the significance of GHG emissions is determined based on whether such emissions would have a cumulatively considerable impact on global climate change. Although the geographic scope of cumulative impacts related to GHG emissions is global, the PEIR analysis focused on the state, the region, and the program's direct and/or indirect generation or offset of GHG emissions. The PEIR found that the program, the Golden Hills Project, and the Patterson Pass Project would result in a long-term net reduction of approximately 96,049 metric tons of CO2e per year, 18,727 metric tons of CO2e per year, and 6,204 metric tons of CO2e per year, respectively, and would not conflict with the State's GHG reduction goals. The project would contribute to this a long-term net reduction in CO2e, and therefore, the project-specific incremental impact on GHG emissions would not be cumulatively considerable.

Hazards and Hazardous Materials

The project would be required to adhere to regulations that govern hazardous materials storage and handling, water quality BMPs, FAA regulations related to airspace, and fire prevention and management. Together, these measures would ensure that impacts related to exposure to hazardous materials would be minimized and/or avoided. Therefore, the project's incremental, less-than-significant impacts in these areas would not be cumulatively considerable.

Noise

Implementation of PEIR Mitigation Measure NOI-1, however, would ensure compliance with County noise standards and would avoid significant cumulative operational noise impacts. Construction of multiple repowering projects simultaneously in the program area could potentially result in a cumulative construction noise impact at residences located near the construction activities. However, as concluded in the PEIR, the impact would be temporary and localized and implementation of PEIR Mitigation Measure NOI-2 would reduce cumulative impacts to a less-than-significant level.

Transportation

Because the PEIR concluded that any proposed repowering projects with the construction activities taking place concurrently with construction of the a repowering project at the location of the Sand Hill project site would contribute to a significant and unavoidable cumulative impact on traffic operation, safety hazards, emergency access, and bicycle facilities on the roadway and bicycle facilities in the vicinity, the Sand Hill Project would be a contributor to the cumulative traffic impact identified in the PEIR. The project will make a cumulatively considerable contribution to the cumulative traffic impact identified in the PEIR.

Topics not Assessed Separately in the PEIR

In addition, the following topics were not assessed separately in the PEIR and in this section, whether there would be cumulative impacts and whether the Project would make a cumulatively considerable contribution to those impacts is examined.

Energy

As described in Section 3.06, Energy, the Project would have No Impact related to conflict with or obstruction of a state or local plan for renewable energy or energy efficiency. Project construction, which would be a short-term impact, would be reduced to less than significant by BACT and other construction-related mitigation measures. The residual impact related to energy use by construction equipment would be small. For these reasons, there would be no cumulative impact related to energy.

Tribal Cultural Resources

As described in Section 3.17, Tribal Cultural Resources, there are no tribal cultural resources in or near the Project area. Therefore, there would be no cumulative impact related to tribal cultural resources.

Wildfire

Wildfire was addressed in the PEIR as a part of the assessment of Hazards impacts, and the cumulative impacts analysis for this topic is described above.

5.3 Growth-Inducing Impacts

Section 21100(b)(5) of CEQA requires an EIR to discuss how a project, if implemented, may induce growth and the impacts of that induced growth (see also State CEQA Guidelines Section 15126). CEQA requires the EIR to discuss specifically "the ways in which the project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment" (State CEQA Guidelines Section 15126.2[d]). The State CEQA Guidelines do not provide specific criteria for evaluating growth inducement and state that growth in any area is "necessarily beneficial, detrimental, or of little significance to the environment." CEQA does not require separate mitigation for growth inducement as it is assumed that these impacts are already captured in the analysis of environmental impacts (see Chapter 3, *Impact Analysis*). Furthermore, the State CEQA Guidelines require that an EIR "discuss the ways" a project could be growth inducing and to "discuss the characteristic of some projects which may encourage and facilitate other activities that could significantly affect the environment."

According to the State CEQA Guidelines, a project would have potential to induce growth if it would result in either of the following.

- Remove obstacles to population growth (e.g., through the expansion of public services into an area that does not currently receive these services), or through the provision of new access to an area, or a change in a restrictive zoning or General Plan land use designation.
- Result in economic expansion and population growth through employment opportunities and/or construction of new housing.

In general, a project could be considered growth-inducing if it directly or indirectly affects the ability of agencies to provide needed public services, or if it can be demonstrated that the potential growth significantly affects the environment in some other way. However, the State CEQA Guidelines do not require a prediction or speculation of where, when, and in what form such growth would occur (State CEQA Guidelines, Section 15145).

PEIR Section 5.2 provided a detailed description of the potential growth-inducing impacts of the program. The conclusion of the PEIR was that the program would not be expected to indirectly induce population growth through the construction of new service roads or electrical infrastructure and that the employment opportunities provided by program construction are not anticipated to induce indirect growth in the region. The analysis in Section 5.2 of the PEIR is incorporated here by reference. Similar to the findings of the PEIR regarding the two projects analyzed in that document, the Sand Hill Project's potential for growth inducement would be similar to the program but of a smaller scale. Therefore, the Project would not be expected to indirectly induce population growth through the construction of new service roads or electrical infrastructure and the employment opportunities provided by Project construction are not anticipated to induce indirect growth in the region.

5.4 Significant and Unavoidable Impacts

Section 21067 of CEQA and Sections 15126(b) and 15126.2(b) of the State CEQA Guidelines require that an EIR describe any significant impacts, including those that can be mitigated but not reduced to a less-than-significant level. Furthermore, where there are impacts that cannot be alleviated without imposing an alternative design, their implications and the reasons why the project is being proposed, notwithstanding their effect, should also be described.

5.4.1 Program Impacts

PEIR Section 5.1 identified the following significant and unavoidable impacts.

- Air Quality: Construction emissions of ROG and NOX for program would exceed the BAAQMD thresholds after implementation of Mitigation Measures AQ-1 and AQ-2, (Table 3.3-11); accordingly, cumulative construction impacts would be significant and unavoidable. For the Golden Hills and Patterson Pass projects individually, construction emissions of NOX would exceed the BAAQMD thresholds after implementation of Mitigation Measures AQ-1 and AQ-2 (Tables 3.3-16 and 3.3-21); accordingly, cumulative construction impacts would be significant and unavoidable.
- Biological Resources: Operation of the either of the program alternatives, as well as the Golden Hills and Patterson Pass projects considered separately, would result in turbine-related mortality of raptors, other birds, and bats migrating through and wintering in the program area. Although mitigation can reduce these impacts, the likelihood of ongoing turbine-related mortality would constitute a significant and unavoidable impact.
- Cumulative Traffic Impacts: cumulative impacts on traffic operation, safety hazards, emergency access, and bicycle facilities could result from program and project construction activities if they take place concurrently with construction of the Sand Hill Repowering Project, which has been identified as resulting in a significant and unavoidable traffic impact.

The findings of the analysis in this SEIR do not identify any additional significant and unavoidable program impacts.

5.4.2 Project Impacts

This SEIR identifies the following significant and unavoidable impacts for the proposed Sand Hill Project.

Biological Resources

Impact BIO-11: Avian mortality resulting from interaction with wind energy facilities

Impact BIO-14: Turbine-related fatalities of special-status and other bats

Impact BIO-19: Potential impact on the movement of any native resident or migratory wildlife species or established native resident or migratory wildlife corridors, and the use of native wildlife nursery sites

5.5 Significant Irreversible Environmental Changes

State CEQA Guidelines Section 15126.2(c) requires that an EIR discuss any environmental changes that would be irreversible if a project were implemented. CEQA defines irreversible environmental changes as the irretrievable commitment of resources and/or irreversible damage resulting from environmental accidents. Irreversible changes may include current or future uses of non-renewable resources, and secondary or growth inducing impacts that commit future generations to similar uses. The State CEQA Guidelines describe three distinct categories of significant irreversible changes, including changes in land use that would commit future generations to specific uses; irreversible changes from environmental actions; and consumption of nonrenewable resources.

5.5.1 Changes in Land Use Which Would Commit Future Generations

The program area and the Sand Hill Project area, which falls within the program area, are located in eastern Alameda County. The area is currently the location of extensive wind farm development. The *East County Area Plan* designates the entire program area as Large Parcel Agriculture (LPA). According to the *East County Area Plan*, a wind farm is a permitted use with a Conditional Use Permit. The program and the Sand Hill Project would not commit future generations to or introduce changes in land use that would vary from the existing conditions.

5.5.2 Irreversible Changes from Environmental Actions

The PEIR found that the program involved the construction and repowering of existing wind farms on approximately 50,000 acres in unincorporated eastern Alameda County, and that the commitment of nonrenewable resources, such as sand, gravel and other components of cement, metals and fossil fuels, necessary for construction and operation of the repowered wind farms would be irreversible. The Project would similarly commit such materials for construction and operation of the repowered wind farm, although on much a smaller scale, but also a irreversible commitment.

With regard to changes in populations over avian species related to turbine operations, the Project would contribute to increased mortality rates among certain species, as discussed in Chapter 3.4, Biological Resources, of this SEIR and above under the discussion of cumulative impacts. In particular, the proposed Project, in combination with other past, present, reasonably foreseeable projects, would make a considerable contribution to a cumulative impact on golden eagles. However, it is important to recognize that there is substantial uncertainty regarding cumulative impacts to golden eagles. This uncertainty primarily stems from two sources: uncertainty regarding the magnitude of wind power development impacts on golden eagles, and uncertainty regarding the current and future population status of golden eagles. With regard to wind power development impacts, the existing repowered projects used to estimate the golden eagle fatality rate have monitored fatality rates ranging from 0.01 to 0.15 fatalities per year, per megawatt (Table 3-4). Overall fatality rates within the APWRA are likely to fall near the middle of this, range but that assumption is based on limited monitoring data. Continued fatality monitoring will be needed to achieve high confidence in the magnitude of wind turbine-caused fatalities. With regard to the golden eagle population, the analysis presented above (Page 5-9) shows that total golden eagle fatalities in the cumulative context are still appreciably lower than the estimated annual productivity of the Diablo Range eagle population, but also notes that natural productivity could decline appreciably in the event of a prolonged drought event; such droughts recur in California with some regularity, at a timescale of years to decades. The conjunction of these uncertainties, in both wind power mortality rates and climatic conditions, creates a small risk of future irreversible changes to biological resources. However, given mortality rates similar to those now observed and climate conditions similar to those recorded in prior investigations (see discussion on page 5-9), such an irreversible change would not occur.

5.5.3 Consumption of Nonrenewable Resources

The PEIR found that construction of repowered wind farms would require the consumption of nonrenewable resources, such as fuel for construction vehicles and equipment. However, such use would be limited to the short-term construction period.

Operation and maintenance of the Project would not increase the use of nonrenewable resources relative to existing conditions. The temporary, construction-related increase would not result in significant use of nonrenewable resources and would not commit future generations to similar uses. Moreover, the primary objective of the Project is to provide an economically viable source of clean, renewable electricity generation that meets California's growing demand for power and fulfills numerous state and national renewable energy policies. The intent is to specifically reduce consumption of non-renewable sources of energy such as coal, natural gas, and other hydrocarbon-based fuels.

5.6 References Cited

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Chapter 6
Report Preparers

The following individuals participated in the preparation of this analysis.

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Appendix A
Agency and Public Comments

ALAMEDA COUNTY COMMUNITY DEVELOPMENT AGENCY

PLANNING DEPARTMENT

January 3, 2018

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TO: Interested Parties and Agencies

FROM: Andrew Young, Planner
Alameda County Planning Department/Community Development Agency
224 W. Winton Avenue, Suite 110
Hayward, CA, 94544

SUBJECT: Notice of Preparation (Notice) of a Subsequent Environmental Impact Report (SEIR) for the Sand Hill Wind Repowering Project, tiered under the Altamont Pass Wind Resource Area Repowering Final Program Environmental Impact Report (PEIR, State Clearinghouse #2010082063), certified November 12, 2014. County Planning Application PLN2017-00201.

SUMMARY:

Notice is hereby given that the County of Alameda (County) will be the Lead Agency and will prepare a Subsequent Environmental Impact Report (SEIR) for the Sand Hill Wind Repowering Project (Project) pursuant to the California Environmental Quality Act (CEQA, 1970, as amended). The Project is an application for a Conditional Use Permit (CUP) to repower (i.e., redevelop) an estimated 671 existing or previously existing wind energy turbine sites with up to 40 new turbines with nameplate production capacity rated between 2.3 and 3.8 megawatts (MW) each (potentially up to 4.0 MW), that together will have a maximum production capacity of 144.5 MW. The Project is proposed on 15 nearly contiguous parcels extending over approximately 2,600 acres within the northeasterly quadrant of the Alameda County portion of the Altamont Pass Wind Resource Area (APWRA) in northern California. The purpose of the SEIR will be to evaluate the specific environmental effects of the Project as proposed by Sand Hill (Sand Hill) Wind, LLC, a subsidiary of sPower (aka Sustainable Power Group).

The purpose of this notice is to request that you or your organization or agency, including Native American Tribes, provide comment on the proposed scope and content of the SEIR as described herein. Although the County has previously provided public notice of the Project proposal, in the form of An Environmental Analysis (EA) and CEQA Implementation Checklist as described below, that has resulted in public and agency comments that will be used to define the scope and content of the SEIR, a formal Notice of Preparation consistent with Sections 15082 and 15375 of the CEQA Guidelines is considered appropriate for an SEIR, and therefore additional comment on the scope of topics to be addressed in the SEIR is requested. The County is particularly interested in hearing from public agencies regarding their objectives for environmental information to be included in the SEIR that is germane to public agencies' statutory responsibilities pertaining to the Project, and how such information in the SEIR will inform such agencies when considering issuing permits or other approvals for Project-related activities.

An Environmental Analysis (EA) and CEQA Implementation Checklist (equivalent to an initial study) for the Sand Hill Wind Project was circulated to public agencies and interested parties and published on the County Planning Department's webpage beginning on September 14, 2018. The EA describes in detail the proposal and anticipated environmental impacts and mitigation measures. A public hearing to take public comment on the EA was held on September 27, 2018, and a hearing to consider approval of the Project was scheduled for October 25, 2018 but was postponed indefinitely on October 22 while the County considered the need for additional study or documentation of its approach to complying with CEQA. After due consideration of comments received from the California Attorney General, the California Department of Fish and Wildlife and the Golden Gate Audubon Society, the County has determined that a Subsequent EIR is an appropriate means of complying with its obligations under CEQA. The EA and Checklist, together with technical appendices remain available on the webpage for reference purposes pending completion of the SEIR, although some of the assertions and understanding of the Project in the EA will be revised by the SEIR, as described herein.

Due to the time limits mandated by state law, public agencies are requested to send their responses to this Notice to the County at the address and person provided above as soon as possible but not later than 30 days after receipt of this Notice (which the County will assume is January 7, 2019 unless documented otherwise). Members of the public should provide scoping comments by February 6, 2018. Agencies and organizations are requested to provide a contact name in your organization for any further consultation.

BACKGROUND

The Altamont Pass Wind Resource Area (APWRA) was designated by the state of California as a wind resource area in the late 1970s and was developed with several thousand wind turbines by the mid-1990s operated by several different operating companies under various Conditional Use Permits (CUPs). These "wind farm" operations were approved for continued use through 2018 under 31 CUPs in 2005 with a requirement that phased repowering occur over the period of the CUPs, and that a Program EIR (PEIR) be prepared to evaluate the potential environmental impacts and effects of such repowering. Repowering is the replacement of older generation wind turbines with new turbines, technology and infrastructure, with goals that include greater efficiency, reduced maintenance costs, and lowering avian mortality that had been documented since the 1990s due to wind farm operations.

Consistent with the intent of the conditions of approval for the renewals or permit extensions in 2005, and pursuant to CEQA Guidelines Section 15168, the PEIR was prepared and certified on November 12, 2014. The PEIR represented a program-level evaluation of the planned repowering of the APWRA, with focused attention on two program alternatives of total buildout or complete repowering, either 417 MW (Alternative 1, based on the peak level of production capacity in Alameda County as of 1998) or 450 MW (Alternative 2, based on a modest increase of less than 10 percent in energy production over Alternative 1). The PEIR also incorporated project-level evaluation of two proposed repowering projects, the Golden Hills Wind Project proposed by Next Era Energy Resources and the Patterson Pass Project proposed by EDF Renewable Energy. Additional background, discussion of the prior CEQA evaluation of the Sand Hill Wind Project and why a subsequent EIR appears appropriate is discussed further below.

In May 2016, a previous version of the Project was approved for Sand Hill Wind LLC when it and its wind farm assets were owned by Ogin, Inc. and the proposal was limited to eight of the current Project parcels, containing 433 wind turbines or turbine sites. That project (application PLN2015-00198) would have resulted in 12 new turbines with a maximum capacity of 36 MW. The CEQA project review of the 2016 project was tiered under the PEIR. Another earlier project to repower the same 433 wind turbines and turbine sites with an experimental 'shrouded turbine' design (application PLN2013-00013) was also approved in March 2014, which would have resulted in 40 new turbines with a capacity of 4 MW. Neither of these prior projects were built or obtained any construction permits.

PROJECT DESCRIPTION

Project Location. The Project is proposed on 15 nearly contiguous parcels extending over approximately 2,600 acres in the eastern Altamont Pass area of Alameda County, located north and south of Altamont Pass Road between two-thirds and two miles west of Grant Line Road, east and west of Mountain House

Road between one-quarter and two miles north of Grant Line Road, west of the Delta-Mendota Canal one mile northwest of Mountain House Road, west of Bethany Reservoir and southeast of the intersection of Christensen and Bruns Roads. The 15 parcels are designated with the following Assessor's Parcel Nos. (APNs): 99B-7750-6; 99B-6325-1-4; 99B-6375-1-3; 99B-7375-1-7; 99B-7400-1-5; 99B 7300-1-5; 99B-7050-4-6; 99B-7050-1-9; 99B-7050-4-1: 99B-7350-2-1; 99B-7350-2-15; 99B-7350-2-5; 99B-7500-3-2; 99B-7500-3-1; and 99B-7600-1-1. Two other APNs, 099B-7875-001-02 and 099B-7875-001-03, located approximately one mile south of Altamont Pass Road on the east side of Midway Road, for which Sand Hill Wind LLC previously acquired leases for repowering, require ground-disturbing activities as part of the Project to decommission the turbine sites and infrastructure but will not be repowered.

<u>Proposed Project</u>. The Sand Hill Wind Project would decommission a total of 671 old generation wind turbines or former turbine sites and replace them with up to 40 new wind turbines. The Project proponent sPower, also known as Sustainable Power Group, is jointly owned by AES Corporation and Alberta Investment Management Corporation or AIMCo. The Project proposes to utilize turbines with generating capacities between 2.3 and 3.8 MW, all generally similar in size and appearance, to develop up to 144.5 MW in generating capacity. The applicant also seeks permission to install turbines with a generating capacity of 4.0 MW if such a model is available at the time of planning their installation but would not in any case exceed a total output capacity of 144.5 MW.

Three conceptual alternative layouts are proposed, each using up to 40 wind turbines. The layouts are substantially similar, mainly varying according to the location of 11 turbines in the center of the Project area, south and west of Bethany Reservoir, and their relative distance from the main access or service road. The final layout would be selected based on site constraints (e.g., avian siting considerations, also known as micro-siting), data obtained from meteorological monitoring of the wind resources, and turbine availability. Each of these factors would be considered when micro-siting turbines, with the final layout reflecting one or some combination of the alternative layouts. A new maintenance and operations building is planned south of Altamont Pass Road on APN 99B-7750-006-00. Existing roads would be used where possible, and temporary widening and some new roads would be necessary. The Project would also require three generation-tie (gen-tie) lines connecting the Project to two substations.

The Project will repower the 433 turbines or turbine sites that were approved in 2016 for repowering, as well as three parcels that contained 238 turbines or turbine sites, and four other parcels that contained an estimated 200 turbines that were removed in the late 1990s. The current Project therefore represents a substantial increase in its area from the 2016 approval, while also eliminating two parcels bordering Midway Road from the repowering plan. The replacement of 671 turbines and turbine sites (not including those removed in the 1990s) with 40 new turbines represents a replacement ratio of nearly one new turbine installed per 17 old-generation turbines removed.

Other Project components or major tasks include grading and construction of new or expanded roads (using existing road networks as much as possible), installing wind turbine foundations and pad-mounted transformers, erecting the turbine towers and installing the generators and rotor blades, installing a power collection system (using existing electrical power transmission lines and substation infrastructure wherever possible), and constructing a new operations and maintenance (O&M) facility.

Decommissioning the existing turbines will involve removing the old generation turbine blades, generators, towers and foundations, old transformer equipment and power lines (above and below ground) and salvaging any useful components or materials. Recycling and disposal of material will be subject to the County's waste ordinances. Old foundations are typically excavated and removed to a depth of 3 feet and remaining components buried in place. State and federal resource agencies will review the decommissioning plans to assess the potential need to leave some foundations in place for terrestrial habitat usage, and landowners will also assist in determining which and to what extent existing access roads – primitive or more developed – should be retained, allowed to go to seed, or recontoured for grassland restoration. A substantial degree of decommissioning has already taken place in the form of turbine generator and tower removals, partly as required by the prior CUPs to remove turbines rated most hazardous to avian safety.

The proposed turbines would be three-blade, upwind turbines on tubular towers, generally similar to those analyzed in the PEIR. **Table 1** below shows the maximum dimensions of this range for comparison with the largest of three turbine types under consideration for the Project.

Table 1. Turbine Specifications Contemplated in the PEIR and for Use with the Proposed Project

Turbine Model	PEIR Maximum—3.0 MW	General Electric 3.6 MW[1]
Rotor type	3-blade/horizontal axis	3-blade/horizontal axis
Blade length	62.5 m (205 ft)	67.2 m (220 ft)
Rotor diameter	125 m (410 ft)	137 m (449 ft)
Rotor-swept area	12,259 m^2 (131,955 ft^2)	14,741 m^2 (158,671 ft^2)
Tower type	Tubular	Tubular
Tower (hub) height	96 m (315 ft)	83.6 m (274 ft)
Total height (from ground to top of blade)	153 m (502 ft)	152 m (499 ft)

[1] 3.8 and potentially 4.0 MW turbines are also under consideration; however, the 3.6MW turbine is the largest turbine in all dimensions based on current information and is therefore presented here as the largest under consideration.

As shown in **Table 1**, the proposed Sand Hill turbines would be comparable to the specifications provided in the PEIR for rotor type, tower type, tower (hub) height, and total height. However, blade lengths would be up to 15 feet longer (approximately 7%), rotor diameters up to 39 feet greater (approximately 9%), and rotor-swept area up to 2,482 m^2 larger (approximately 20%).

All the proposed wind turbines would require appropriate nighttime lighting to comply with Federal Aviation Administration (FAA) requirements for obstruction lighting on structures over 200 feet in height. Although it had been the goal for the number of lights to be minimized to avoid attracting birds during nighttime migrations, and to provide lights only on strategically located turbines to adequately mark the extent of the proposed Project, compliance with the FAA Obstruction Marking and Lighting Advisory Circular (AC70/7460-1K) may require lighting of each individual wind turbine. Intensity of the lights would be based on a level of ambient light, with illumination below 2 foot-candles being normal for the night and illumination of above 5 foot-candles being the standard for daytime.

CEQA BACKGROUND

Section 15168 of the CEQA Guidelines provides for a Program EIR to be used for a series of actions that are characterized as one large project, related geographically, logically, or as individual activities carried out under the same authority with generally similar environmental effects that can be mitigated in similar ways. The overall repowering of the APWRA within Alameda County was therefore appropriately evaluated in a PEIR. CEQA Guidelines Section 15168(b) lists the advantages of a PEIR as allowing the lead agency to consider broad policy alternatives and program-wide mitigation measures at an early time when the agency has greater flexibility to deal with basic problems or cumulative impacts. On this basis, the County is able to apply consistent and similar mitigation measures to each repowering project that may be proposed until repowering is considered complete. Additionally, Section 15152 of the Guidelines describes the use and advantages of tiering, wherein the analysis of general matters contained in a broader

EIR (including a Program EIR per Section 15152(h)) is used with later EIRs and negative declarations on narrower projects, incorporating by reference the general discussions from the prior, broader EIR and concentrating the later CEQA analysis solely on the issues specific to the later project.

As set forth in Section 15168(d), a PEIR can be used to simplify the task of preparing environmental documents on later parts of the program (such as a repowering project not evaluated at a project level in the PEIR), and to provide a basis within an Initial Study to determine if the later activity would have significant effects that were not recognized in the PEIR. Since the PEIR was certified in 2014, three other repowering projects have been evaluated at a project level with environmental checklists or an initial study, including a second Next Era project (Golden Hills North), the Summit Wind Energy Project approved for development by AWI, and a prior version of the proposal for repowering by Sand Hill Wind LLC when its assets were owned by Ogin, Inc.

Alternatively, Section 15162 of the CEQA Guidelines (and additionally in Public Resources Code 21166, in the CEQA Statutes) provides that after an EIR for a project has been certified no subsequent EIR shall be prepared for that project unless the lead agency determines, on the basis of substantial evidence in light of the whole record, the presence of one or more of three conditions, listed below:

1) Substantial changes have been made to the project which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects.
2) Substantial changes in the circumstances under which a project would occur will result in one or more new significant or substantially more significant environmental effects; or
3) New information, which was not and could not have been known at the time the previous document was completed, indicates potentially new significant or substantially more significant environmental effects, new feasible mitigation that could reduce a significant effect of the project, or significant effects will be substantially more severe than previously identified.

Section 15163 of the CEQA Guidelines provide that a lead agency may prepare a supplemental EIR instead of a subsequent EIR if it determines that although one of the above conditions has occurred, only minor additions or changes to the prior EIR would be necessary to make it adequate to apply to the Project currently proposed. Furthermore, Section 15164 provides that an addendum to a prior certified EIR is to be prepared if none of the above conditions have occurred, and only minor technical changes or additions are necessary to make the prior EIR adequate.

As noted above, the County previously issued an Environmental Analysis (EA) in September 2018 that provided public agencies and the public with a detailed Project description and an analysis of how the Sand Hill Wind Project would fit within the scope of the PEIR and would not require either a subsequent or supplemental EIR. The EA and Checklist also provided a detailed description of the environmental impacts of the Project and identified the mitigation measures that would be required to be implemented, all of which (both impacts and mitigation measures) had previously been identified in the PEIR.

The County originally held the position, expressed in the EA, that the Project did not represent substantial changes to the project (or program described in the PEIR) which would require a subsequent or supplemental EIR, and further that no new significant effects or severity of identified impacts were anticipated, and no new information existed that could not have been known at the time the PEIR was certified showing that new mitigation measures or alternatives existed that would reduce the significant effects of the Project. However, after careful consideration of the comments received from the state Attorney General, Department of Fish and Wildlife and the Golden Gate Audubon Society regarding the EA, the County has determined that one or more of the three conditions that require a subsequent or supplemental EIR by CEQA Guidelines Section 15162 listed above apply.

PROPOSED SCOPE OF THE SUBSEQUENT EIR

The project-level analysis will address all resource topics; other topics for which there is new information that requires additional analysis are primarily related to biological resources, as outlined below:

1. Avian impacts
    a. Considerations regarding recent studies
    b. Consideration of fatality estimates
    c. Considerations of turbine size and turbine blade risk or swept area
    d. Considerations of micro-siting and detailed consequences of grading
    e. Consideration of candidate species and changes in status
    f. Mitigation measures
2. Bat impacts

The SEIR will also address a range of program-level issues, including:

- How the previously certified PEIR evaluated the construction of up to 450 MW of wind power in the APWRA and the extent to which the Sand Hill Wind Project was adequately evaluated before within the PEIR.
- Technological advances represented by the Project (larger turbines and longer blades) and their potential to result in construction of fewer, larger turbines, and the benefits and impacts of their use.
- The latest science and monitoring results from operational projects in the APWRA and the implications for mortality of bird and bat species and changes to avian and bat fatality estimates.
- Updating a PEIR mitigation measure concerning funding of the U.C. Davis Raptor Center, by clarifying and revising how mitigation costs are determined, and identifying other appropriate avian mitigation related to the Raptor Center or other research and raptor recovery programs.
- Clarifying how the County's setback requirements are applied and how alternative minimum setbacks are appropriate with supporting studies of blade throw, noise or flicker studies, as needed.
- Clarifying that FAA-required lighting must be used and that such lighting is necessary despite having night-time visual effects.
- Updating the requirements for site development review of wind projects.
- Updating annual reporting requirements for projects as necessary.
- Summarizing the extent of temporary and permanent disturbed land and terrestrial species impacts under the program to date and comparing the totals with those presented in the PEIR.

COMMENTS. Comments submitted should focus on mitigation measures or alternatives that may be less costly or have fewer environmental impacts while achieving similar conservation and wind repowering objectives, and the identification of any significant social, economic, or environmental issues related to alternatives and mitigation measures.

DATES: Written comments on the scope of the SEIR, including the Project objectives, the impacts to be evaluated, and the methodologies to be used in the evaluations, should be provided to the County by February 6, 2019.

ADDRESS: Written comments on the Project scope should be sent to Andrew Young, Planner, ATTN: SEIR, Alameda County Community Development Agency, 224 W. Winton Avenue, Suite 110, Hayward, CA, 94544, or via email with subject line "Sand Hill Wind Repowering Project SEIR" to: andrew.young@acgov.org.

The Project objectives and description of the Project is available at the County's Internet site: www.acgov.org/cda/planning/landuseprojects/currentprojects/ or see www.acgov.org/cda/planning, then successive links from Pending Land Use Projects, Current Development Projects, Wind Farm Projects and Sand Hill Wind Project, Application No. 2018-00201

FOR FURTHER INFORMATION CONTACT: Andrew Young, Alameda County Planning Dept., 224 W. Winton Avenue, Suite 110, Hayward, CA, 94544, or at (510) 670-5400, or andrew.young@acgov.org.

Exhibits

Distribution:
United States Fish and Wildlife Service
United States Army Corps of Engineers
California Department of Fish and Wildlife
California Water Boards – San Francisco Regional Water Quality Control Board
California State Native American Heritage Commission
California Department of Justice/Office of the Attorney General, Oakland office
California State Clearinghouse, Office of Planning & Research
Golden Gate Audubon Society
sPower, attn. Korina Cassidy

ANNOTATED, CORRECTED & UPDATED WITH AMENDED END OF COMMENT PERIOD

Public Notice of Availability of a Draft Subsequent Environmental Impact Report: Sand Hill Wind Project

Project Title:	Sand Hill Wind Project – Alameda County Planning Case PLN2017-00201
Project Location – County:	Alameda County
Project Location – Specific:	In the eastern portion of the Altamont Pass Wind Resource Area (APWRA), on fifteen (15) contiguous or nearly contiguous parcels separated by roads, aqueducts and the Bethany Reservoir, on approximately 2,600 acres located north and south of Altamont Pass Road between 0.67 and 2 miles west of Grant Line Road, east and west of Mountain House Road between 0.25 and 2 miles north of Grant Line Road, west of the Delta-Mendota Canal, extending also 1 mile northwest of Mountain House Road west of the Delta-Mendota Canal, and on parcels generally west of Bethany Reservoir and southeast of the intersection of Christensen and Bruns Roads.

Description of Nature, Purpose, and Beneficiaries of the Project:

The project that is the subject of the Draft Subsequent Environmental Impact Report (DSEIR) is the requested approval by Alameda County of a new Conditional Use Permit (CUP) to allow the fifteen Project parcels to be developed or repowered (i.e., to replace previously installed energy-generating wind turbines) with up to 40 new fourth-generation wind turbines, including supporting roadways, power collection systems, transformers and other infrastructure. The Project proposal would replace an estimated 671 existing or previously existing wind energy turbine sites (in place as of 2010) with 40 turbines with a nameplate production capacity rated between 2.3 and 3.8 megawatts (MW) each and potentially up to 4.0 MW if available at the time of construction, that together will have a maximum production capacity of 144.5 MW. The proposed use is permitted by the East County Area Plan (ECAP) which designates the APWRA as Large Parcel Agriculture (LPA), and is conditionally permitted in the "A" (Agriculture) zone district established by the County Zoning Ordinance.

The Project is proposed by Sand Hill (Sand Hill) Wind, LLC, a subsidiary of sPower (aka Sustainable Power Group). Project objectives include maximizing wind energy production for Power Purchase Agreements obtained for the Project by the proponent, maintain commercial viability, assist the state of California in meeting its goals for Renewables Portfolio Standards (RPS), greenhouse gas reduction, and carbon neutrality, provide economic benefits to Alameda County, increase local short-term and long-term employment opportunities, and minimize environmental impacts. Environmental effects are meant to be reduced by limiting ground disturbance through the re-use of existing infrastructure (e.g., roads, transmission lines) where feasible, and improving scientific understanding of the effects of new generation turbines on birds and bats by applying the same avian mortality monitoring protocol across a large segment of the program area, rather than separate protocols for multiple separate projects.

The DSEIR is intended to identify the environmental impacts of the Project, recommends measures to reduce or avoid potential environmental damage resulting from the Project, and identifies alternatives to the proposed Project. The DSEIR has been prepared pursuant to Section 15162 of the California Environmental Quality Act (CEQA) Guidelines, and is tiered under the Altamont Pass Wind Resource Area Repowering Final Program Environmental Impact Report (PEIR, State Clearinghouse #2010082063), certified November 12, 2014.

Environmental review of the Project under CEQA began with the publication in September 2018 of an Environmental Analysis (EA) with supporting technical information intended to identify site-specific Project effects pursuant to Section 15168 of the CEQA Guidelines, providing for use of a Program EIR with later activities. The County had previously approved three wind repowering projects that had been tiered under similar documentation. However, after receiving comments on the EA in advance of a public hearing to consider approving the Project on such basis, the County decided to prepare this SEIR based on its determination that the current Project proposes turbines with characteristics sufficiently distinct from those described in the PEIR and is proposed in the context of new information that together support the decision to prepare a subsequent EIR.

Lead Agency: Alameda County, Community Development Agency, Planning Department

Addresses Where Copy of PEIR is Available:

The DSEIR is available for review during normal business hours (8:30 a.m. to 5:00 p.m.), Monday through Friday, excluding holidays, at the Alameda County Community Development Agency, Planning Department, at 224 West Winton Avenue, Room 111, Hayward, California, 94544. The DSPEIR is also available for viewing at the following public libraries:

OAKLAND MAIN LIBRARY
125 14th St.
Oakland, CA 94612
510-238-3134

LIVERMORE PUBLIC LIBRARY
1188 South Livermore Avenue
Livermore, CA 94550-9315
925-373-5500

TRACY PUBLIC LIBRARY
20 E. Eaton Ave.
Tracy, CA 95376
209-937-8221

The DEIR is also available for review or download at the Alameda County website (www.acgov.org/cda/planning —select "Pending Land Use Projects" - "Current Development Projects" – and under the heading "Ongoing Land Use Projects", see "Wind Farm Projects" and then scroll to "Sand Hill Wind Project – Application No. PLN2017-00201".)

Review Period: August 9, 2019 to ~~September 23, 2019~~ October 4, 2019 (5:00 p.m)

Contact Person: Comments on this draft PEIR are due to the County no later than 5 p.m. on ~~July 21,~~ October 4, 2019 ~~2014~~, and can be forwarded by any of the following methods.

Mail: Andrew Young, Senior Planner
Alameda County CDA / Planning Dept.
224 W. Winton, Room 111
Hayward, CA 94544

Email: andrew.young@acgov.org

Fax: 510-785-8793

A public hearing is tentatively scheduled to be held at 1:30 p.m. on September 12, 2019, at a meeting of the East County Board of Zoning Adjustments, in the City of Pleasanton Council Chambers, 200 Old Bernal Avenue, Pleasanton. Comments on the Draft SEIR will be received during the regularly scheduled meeting.

Authority cited: Section 21083, Public Resources Code. Reference: Sections 21092, 21152, and 21153, Public Resources Code. **Revised 2005**

Public Notice of Availability of Draft SEIR ~~PEIR~~, continued (p. 3 of 3)

Significant Environmental Effects Anticipated from Project Implementation

The repowering activities associated with the Sand Hill Wind Project is expected to result in the following impacts, that with the exception of effects on avian and bat species, can be avoided or reduced to less than significant levels with identified mitigation measures:

- Significant and unavoidable adverse impacts on biological resources, due to mortality of raptors, other birds, and bats migrating through and wintering in the Project area.
- Significant temporary air quality effects due to emission of reactive organic gases and nitrogen oxides during construction in excess of air district standards.
- Other air quality impacts during construction due to dust and equipment emissions.
- Significant visual impacts on scenic vistas, scenic highways, visual character, light and glare related to shadow flicker, and conformity to state and local policies on visual resources.
- Other impacts on biological resources, including special-status plants, a wide range of terrestrial species, habitat communities, migratory wildlife corridors and nursery sites.
- Potential adverse changes to the significance of historical, archaeological or paleontological resources, or disturbance of human remains, including those not interred in formal cemeteries.
- Expose people or structures to potential property loss, injury or death, as a result of rupture of a known earthquake fault, strong seismically-induced ground shaking, ground failure, landsliding, liquefaction or expansive soil conditions.
- Ground disturbance on sites designated as containing hazardous materials, resulting in a hazard to the public or the environment.
- Conflict with applicable plans, policies and/or regulations adopted for the purpose of reducing the emissions of greenhouse gases, on a temporary basis due to construction.
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.
- Potential violations of specific water quality standards or waste discharge requirements, alteration of streams with the possibility of substantial erosion or siltation, or flooding due to increases in the rate or amount of surface runoff, or potential other sources of polluted runoff.
- Potentially significant exposure of residences to noise from new wind turbines, and noise from decommissioning and new construction activities.
- Conflict with applicable plans, policies and/or regulations regarding performance standards for the circulation system, including transit, bicycle and pedestrian facilities, or increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses.
- Substantial impairment of an adopted emergency response plan or emergency evacuation plan due to risk of wildfire.

Government Code 65962.5 Listing of Hazardous Waste Properties or Other Sites with Risk of Exposure to Hazardous Materials

The DSEIR describes a search of the site on lists of sites enumerated under Section 65962.5 of the Government Code and determined that no properties within the Project boundaries are so listed.

Print Form

Appendix C

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH #

Project Title: Sand Hill Wind Repowering Project

Lead Agency: County of Alameda
Contact Person: Andrew Young
Mailing Address: 224 W. Winton Avenue, Suite 110
Phone: (510) 670-5400
City: Hayward
Zip: 94544
County: Alameda

Project Location: County: Alameda
City/Nearest Community: Livermore
Cross Streets: Altamont Pass Wind Resource Area
Zip Code:
Longitude/Latitude (degrees, minutes and seconds): 37 ° 44 ′ 50 ″ N / 121 ° 35 ′ 50 ″ W Total Acres:
Assessor's Parcel No.: Section: Twp.: Range: Base:
Within 2 Miles: State Hwy #: I-580 and I-205
Waterways: Clifton Court Forebay, California Aqueduct
Airports: Railways: Schools:

Document Type:

CEQA: ☒ NOP ☐ Early Cons ☐ Neg Dec ☐ Mit Neg Dec ☐ Draft EIR ☒ Supplement/Subsequent EIR (Prior SCH No.) 2010082063 Other:

NEPA: ☐ NOI ☐ EA ☐ Draft EIS ☐ FONSI

Other: ☐ Joint Document ☐ Final Document ☐ Other:

Local Action Type:

☐ General Plan Update ☐ General Plan Amendment ☐ General Plan Element ☐ Community Plan ☐ Specific Plan ☐ Master Plan ☐ Planned Unit Development ☐ Site Plan ☐ Rezone ☐ Prezone ☒ Use Permit ☐ Land Division (Subdivision, etc.) ☐ Annexation ☐ Redevelopment ☐ Coastal Permit ☐ Other:

Development Type:

☐ Residential: Units Acres
☐ Office: Sq.ft. Acres Employees
☐ Commercial: Sq.ft. Acres Employees
☐ Industrial: Sq.ft. Acres Employees
☐ Educational:
☐ Recreational:
☐ Water Facilities: Type MGD
☐ Transportation: Type
☐ Mining: Mineral
☒ Power: Type Wind turbine MW144.5
☐ Waste Treatment: Type MGD
☐ Hazardous Waste: Type
☐ Other:

Project Issues Discussed in Document:

☒ Aesthetic/Visual
☒ Agricultural Land
☒ Air Quality
☒ Archeological/Historical
☒ Biological Resources
☐ Coastal Zone
☒ Drainage/Absorption
☐ Economic/Jobs
☐ Fiscal
☒ Flood Plain/Flooding
☒ Forest Land/Fire Hazard
☒ Geologic/Seismic
☒ Minerals
☒ Noise
☒ Population/Housing Balance
☒ Public Services/Facilities
☒ Recreation/Parks
☐ Schools/Universities
☐ Septic Systems
☐ Sewer Capacity
☒ Soil Erosion/Compaction/Grading
☒ Solid Waste
☒ Toxic/Hazardous
☒ Traffic/Circulation
☒ Vegetation
☒ Water Quality
☐ Water Supply/Groundwater
☒ Wetland/Riparian
☐ Growth Inducement
☒ Land Use
☒ Cumulative Effects
☐ Other:

Present Land Use/Zoning/General Plan Designation:
Large Parcel Agriculture

Project Description: *(please use a separate page if necessary)*
Please see attached.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Revised 2010

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "**X**".
If you have already sent your document to the agency please denote that with an "**S**".

____	Air Resources Board	X	Office of Historic Preservation
____	Boating & Waterways, Department of	____	Office of Public School Construction
____	California Emergency Management Agency	X	Parks & Recreation, Department of
____	California Highway Patrol	____	Pesticide Regulation, Department of
X	Caltrans District #4	X	Public Utilities Commission
X	Caltrans Division of Aeronautics	X	Regional WQCB #2
____	Caltrans Planning	____	Resources Agency
____	Central Valley Flood Protection Board	____	Resources Recycling and Recovery, Department of
____	Coachella Valley Mtns. Conservancy	____	S.F. Bay Conservation & Development Comm.
____	Coastal Commission	____	San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
____	Colorado River Board	____	San Joaquin River Conservancy
X	Conservation, Department of	____	Santa Monica Mtns. Conservancy
____	Corrections, Department of	X	State Lands Commission
____	Delta Protection Commission	____	SWRCB: Clean Water Grants
____	Education, Department of	____	SWRCB: Water Quality
X	Energy Commission	____	SWRCB: Water Rights
X	Fish & Game Region #3	____	Tahoe Regional Planning Agency
____	Food & Agriculture, Department of	X	Toxic Substances Control, Department of
____	Forestry and Fire Protection, Department of	X	Water Resources, Department of
____	General Services, Department of		
____	Health Services, Department of	X	Other: CA Dept. of Justice/Attorney General, Oakland
____	Housing & Community Development	____	Other: ____
X	Native American Heritage Commission		

Local Public Review Period (to be filled in by lead agency)

Starting Date January 3, 2019 Ending Date February 4, 2019

Lead Agency (Complete if applicable):

Consulting Firm: ICF	Applicant: Sand Hill Wind, LLC
Address: 630 K Street, Suite 400	Address: 2180 South 1300 East, Suite 600
City/State/Zip: Sacramento, CA 95814	City/State/Zip: Salt Lake City, UT 84106
Contact: Susan Swift	Phone: 415-692-7727
Phone: 916-737-3000	

Signature of Lead Agency Representative: ____ **Date:** 1/2/2019

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

XAVIER BECERRA
Attorney General

State of California
DEPARTMENT OF JUSTICE

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P.O. BOX 70550
OAKLAND, CA 94612-0550

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February 13, 2019

Andrew Young, Senior Planner
Planning Department
Alameda County Community Development Agency
County of Alameda
224 W. Winton Avenue, Room 110
Hayward, CA 94544

VIA E-MAIL AND OVERNIGHT MAIL: Andrew.Young@acgov.org

RE: ***Comments on Notice of Preparation of Subsequent Environmental Impact Report*: *Sand Hill Wind, LLC, Conditional Use Permit Application, PLN2017-00201***

Dear Mr. Young:

We submit this letter on behalf of the Attorney General in his independent capacity on the County of Alameda's (County's) Notice of Preparation (NOP) of a Subsequent Environmental Impact Report (SEIR) for the proposed Sand Hill Wind Repowering Project, Conditional Use Permit Application, PLN2017-00201 ("Sand Hill Project"). As the County is aware, the Attorney General submitted a detailed comment letter on the Sand Hill Project on October 22, 2018, asserting that, in light of the substantial changes in the project and changed circumstances and significant new information, the County was required to prepare a project-specific SEIR analyzing the site-specific effects of this project in detail. The Attorney General appreciates the County's subsequent decision to prepare an SEIR for this project. The County circulated the NOP for this project, dated January 3, 2019, by mail and email to interested parties on or about January 8, 2019, providing an approximately 30-day public comment period to February 6, 2019. The Attorney General requested and also appreciates receiving from the County an extension of time to submit these comments to February 13, 2019.

As requested in the NOP, this letter provides the Attorney General's comments as to the topics to be covered in detail in the SEIR, within the scope of the Attorney General's authority. NOP at 1; *see also* 14 Cal. Code Regs. § 15082(b)(1). The Attorney General is the chief law enforcement officer of the State of California and has the authority to file civil actions in order to protect public rights and interests, including actions to protect the natural resources of the State. Cal. Const., art. V, § 13; Cal. Gov. Code §§ 12511, 12600-12612; *D'Amico v. Bd. of Medical Examiners*, 11 Cal.3d 1 (1974).

The proposed Sand Hill Project will consist of replacing an estimated 671 existing or previously existing old-generation turbine sites with up to 40 new, 2.3 to 4.0 megawatt (MW) turbines, for a total maximum operating capacity of 144.5 MW. NOP at 1. The project would be located on 15 contiguous parcels on 2,600 acres in the northeastern quadrant of the Alameda County side of the Altamont Pass Wind Resources Area (Altamont Pass). *Id*. The project applicant is Sand Hill Wind, LLC, a subsidiary of S-Power. Three "conceptual" alternate project layouts are proposed, each using up to 40 turbines, and which purportedly are "substantially similar." *Id*. at 3.

This letter focuses on the Sand Hill Project's potentially significant effects on avian and bat resources, and how these effects may differ in nature and extent from the impacts on these resources that were analyzed in the County's November 2014 Program Environmental Impact Report for repowering wind turbines at Altamont Pass (PEIR). In particular, this comment letter discusses the changes in the project, changed circumstances and new information since certification of the PEIR that may affect the adequacy and accuracy of the PEIR's previous determinations regarding: (1) the appropriate baseline for analysis; (2) the nature and extent of the impacts of modern wind turbines in general, and the Sand Hill Project in particular, on birds and bats; and (3) the specific alternatives to and mitigation measures for the project that should be considered in depth in the SEIR in light of these revised impact determinations.

This letter identifies and discusses the key studies and monitoring reports that have been completed since certification of the PEIR.[1] These new studies and reports indicate that the Sand Hill Project is very likely to exceed the PEIR's projected impacts on key raptor species, particularly golden eagles and red-tailed hawks, and bats. As discussed in detail below, the SEIR must consider these additional impacts based on, among other things, recently improved turbine micro-siting models, as applied to the Sand Hill Project using site-specific topographic surveys and surveys of bird and bat use, behavior and distribution in the project area. As required by the PEIR, the SEIR also should include surveys of raptor and bat nesting, roosting and foraging habitat in the project area and vicinity. The SEIR should then develop fesaible project alternatives and an updated and strengthened suite of mitigation measures designed to avoid and minimize these adverse impacts to the extent feasible, as required by CEQA.

The SEIR must incorporate the foregoing analyses in order to be legally adequate under CEQA, to provide adequate and accurate analysis and public disclosure of the project's significant effects on avian and bat resources, and to enable the County to make the required CEQA findings prior to its final determination on the Sand Hill Project. *See* Pub. Res. Code § 21002 ("it is the policy of the state that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects") and 14 Cal. Code Regs. §§ 15002,

[1] Concurrently with this letter, the Attorney General's Office is submitting a CD to the County with copies of some of the key recent studies and reports cited herein and listed in Appendix A hereto. We request that these studies and reports be included in the administrative record for this project, and that the County consider them in preparing the SEIR.

15003 (describing fundamental purposes and policies of CEQA and EIRs); *see also* Pub. Res. Code § 21002.1(a)-(c).

I. <u>BASELINE AND EXISTING CONDITIONS</u>

The California Environmental Quality Act (CEQA) Guidelines provides that "[g]enerally, the lead agency should describe physical environmental conditions as they exist at the time the notice of preparation is published . . . from both a local and regional perspective." 14 Cal. Code Regs. § 15125(a)(1). "An existing conditions baseline shall not include hypothetical conditions, such as those that might be allowed, but have never actually occurred, under existing permits or plans, as the baseline." *Id*. § 15125(a)(3). In addition, because site conditions on the Sand Hill Project site are not fluctuating over time, this is not a situation where a projected future baseline is appropriate. *Id*. § 15125(a)(1)-(2). An EIR's assessment of project impacts should normally be limited "to changes in the existing physical conditions in the affected area as they exist at the time the notice of preparation is published." *Id.* § 15126.2(a); *see also Communities for a Better Envt. v. SCAQMD*, 48 Cal.4th 310, 320-21 (2010).

The NOP states that "[t]he Project will repower the 433 turbines or *turbine sites* that were approved in 2016 for repowering, as well as three parcels that *contained* 238 turbines or turbine sites, and four other parcels that *contained* an estimated 200 turbines *that were removed in the late 1990s*." NOP at 3 (emphasis added). The NOP also notes that "[a] substantial degree of decommissioning has already taken place in the form of turbine generator and tower removals, partly as required by the prior [conditional use permits] CUPs." *Id*. at 4.

The SEIR should include a complete description of the site conditions for each project parcel, as they exist today, as the primary project baseline. The old turbines were required to have been shut down and removed by the end of 2015, or at the latest by the end of 2018, under the County CUPs applicable to the old-generation turbines. Thus, the appropriate baseline for this project is the current conditions of the project site, and not the site conditions with fully operational old-generation turbines as under the PEIR. PEIR, Comments and Responses to Comments App. E, E-2.

The SEIR's discussion of existing site conditions should address the following questions for each project parcel:

1) How many old generation turbines are still operating, if any, and where are each of these turbines located? What are the models, sizes and owners/operators of these old turbines? Will these operational turbines be shut down and removed as part of the Sand Hill Project? (If so, this aspect should be discussed in the SEIR's impact analysis, discussed in Part III below.)

2) How many old turbines that were previously located on the project site have been shut down and removed, when were these shut down and removed, and where were these previous turbine sites located?

3) How many old turbines or turbine components have been shut down but *not* removed and where are these located? Do these old turbine towers provide perching or nesting opportunities or collision hazards for raptors and other birds and bats? Will these remaining turbines and components be removed as part of the Sand Hill Project? (If so, this aspect, once again, should be analyzed as part of the SEIR's impact analysis.)

With respect to the regional project baseline, the SEIR should discuss the status of wind projects that already have been approved and are operating on both the Alameda and Contra Costa County sides of Altamont Pass, and the total amount of ongoing annual avian and bat deaths that are currently known or estimated to be occurring in the entire Altamont Pass area based on past monitoring results and other available information. The *Sand Hill Wind Repowering Project Environmental Analysis, ICF Intl*., Sept. 2018 (EA) at Table 1-2 (page 1-5) indicates that the County of Alameda has approved four other repowering projects totaling 200.5 MW, two of which are currently operating (Next Era Energy's Golden Hills and Golden Hills North projects).[2] At least two other projects are operating on the Contra Costa County side, the 78 MW Next Era Vasco Winds Project and the 38 MW Buena Vista Project.

The SEIR should discuss the current status of the four focal raptor species (golden eagle, red-tailed hawk, burrowing owl and American kestrel), as well as other affected bird species of special concern, such as tri-colored blackbird, white-tailed kite and Swainson's Hawk, and all affected bat species. The SEIR should discuss the overall impacts to those populations in the Altamont Pass and broader Diablo region from current wind turbine operations and other causes, such as drought, climate change, habitat loss, rodenticides, electrocution, road kills, etc., based on the best available current information.

The PEIR states that the Altamont Pass and surrounding region "support some of the highest known densities of golden eagle nesting territories in the world." PEIR at 3.4.105; *see also id.* at E-36 (Altamont Pass supports "*the* highest known density of golden eagles in the world") (emphasis added). However, the Altamont Pass area "can be considered a population sink" for golden eagles "because the population demands a flow of recruits from outside the area to fill breeding vacancies as they occur." *Id.* at 3.4-106. Therefore, researchers have concluded "that

[2] This table also indicates that, besides the 144.5 MW Sand Hill Project, the County has received or anticipates applications for two other projects (Mulqueeny Ranch and Rooney Ranch), totaling another 105.1 MW. *Id*. The effects of these other anticipated future projects, and projects that are approved but not yet operational, should be discussed in the SEIR's cumulative impact analysis, as discussed further in Part III.B.3 below. *See* 14 Cal. Code Regs. § 15130.

turbine-related mortality reduces the resilience of the local golden eagle population." *Id*. The golden eagle is considered a fully-protected species under state law. Fish & Game Code § 3511(b)(7).

In commenting on the PEIR, the U.S. Fish and Wildlife Service (FWS) noted that it had "determined that the current take rate for the [Altamont Pass] golden eagle local-area population is approximately 12% annually," and that "this level of ongoing take is having a negative effect on the local-area population of golden eagles and could affect the sustainability of this population." PEIR at E-33. The FWS's policy is that "take rates for a local-area [golden eagle] population … should not exceed 5% annually, whether the impacts of a given project have been offset by compensatory mitigation or not, to ensure sustainable populations of golden eagles." *Id.*

Based on its then-estimate of 47 eagle deaths per year for all wind turbines operating at Altamont Pass,[3] the FWS recommended that annual take of golden eagles for all projects on the Alameda County side of Altamont Pass be limited to less than 29 eagles. *Id*. at E-36. The County's response that the total estimated number of golden eagle deaths would not exceed 18 eagles per year, based only on the first two years of monitoring results for the Vasco Winds Project, will need to be updated in light of the most recent monitoring data, as discussed in detail in Part III.B.3 below. *Id.* at E-6, E-40—41.

The PEIR also notes that "it is believed that the [Altamont Pass] may support the largest number of breeding [burrowing owl] pairs in the Bay Area," and that these populations also may not currently be sustainable in some years due to ongoing impacts from wind turbine operations. *Id*. at 3.4-105; *see also id*. at E-37 (FWS comments re burrowing owl on PEIR). Numerous studies have been performed on the status of golden eagle and burrowing owl populations in and around Altamont Pass since the PEIR was certified in 2014, and so the SEIR will need to be updated to account for this information.[4]

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[3] To our knowledge, the FWS has not yet updated this estimate in light of the final monitoring results for the Vasco Winds Project and monitoring results for the first two years of operation of the Golden Hills Project and other more recent data, discussed in Part III.B.3 below.

[4] *See, e.g.*, Weins, D., *et al*., 2018, *Spatial Patterns in Occupancy and Reproduction of Golden Eagles During Drought: Prospects for Conservation in Changing Environments,* Ornithological Applications, 120:106-124.

Kolar, P.S., Weins, D., 2017, *Distribution, Nesting Activities, and Age-Class of Territorial Pairs of Golden Eagles at the Altamont Pass Wind Resource Area, California*, 2014–16, United States Geological Survey, Open-File Report 2017–1035.

Weins, D., *et al*., 2014, *Estimation of Occupancy, Breeding Success, and Abundance of Golden Eagles (Aquila chrysaetos) in the Diablo Range, California,* United States Geological Survey, Open File Report 2015-1039

II. **PROJECT DESCRIPTION**

The CEQA Guidelines require the SEIR to include "[t]he precise location and boundaries of the proposed project [as] shown on a detailed map, preferably topographic. The location of the project shall also appear on a regional map." 14 Cal. Code Regs. § 15124(a). The project description also must include "[a] general description of the project's technical, economic, and environmental characteristics, considering the principal engineering proposals if any and supporting public service facilities." *Id*. § 15124(c).

The SEIR project description should identify, for each of the three proposed Sand Hill Project layouts, the turbine model, size(s) and precise locations. Each proposed project layout also should be overlain with maps showing the locations of each of the current and previously operating old generation turbines and turbine sites, and for comparison purposes, a map of the proposed 12 turbine locations, models and sizes of the previous, 36 MW version, of the Sand Hill Wind Project the County approved in 2016.

III. **PROJECT IMPACTS**

A. Changed Project and Circumstances and New Information Since the 2014 PEIR and Prior Sand Hill Project Approval in 2016

As discussed in the Attorney General's October 22, 2018 comment letter on the Sand Hill Project, and as the County now agrees (NOP at 5-6), there is substantial evidence that this Project will have one or more additional significant effects, or significant effects that are more severe, and that will require additional or different alternatives or mitigation measures, than were examined in the 2014 PEIR.

To summarize, first, the Project has been changed significantly since the County approved the previous version of the Sand Hill Project in 2016. The previous project was to replace 433 existing wind turbines or former turbine sites with up to 12 new 2.5 to 3.0 MW turbines, for up to 36 MW of total generating capacity. The current project is four times as large as the previously approved project and will cover about three times the area. EA at 1-2—1-3; *County Power Point Presentation, Sand Hill Wind Repowering Project, East County BZA,* Sept. 27, 2018. The current project will utilize 40 turbines up to 4.0 MW in size, but the PEIR only analyzed turbines up to 3 MW in size. NOP at 1; *see* PEIR at 2-3—2-4.

Turbine "blade lengths would be up to 15 feet longer (approximately 7%), rotor diameters up to 39 feet greater (approximately 9%), and rotor-swept area up to 2,482 [square] meters larger (approximately 20%)" than those analyzed in the PEIR. NOP at 4. The much larger turbines also will require significant additional upgrades to and widening of existing roads to 20-40 feet and approximately three acres of grading for each turbine pad, which likewise was not discussed

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Smallwood, K.S., *et al., Nesting Burrowing Owl Density Abundance in the Altamont Pass Wind Resource Area, California*, 2013, Wildlife Society Bulletin 37(4):787-795.

in the PEIR. *Appendix B: Biological Resources Evaluation for The Sand Hill Wind Repowering Project*, ICF Intl., Sept. 2018 (BRA), 1-3—1-4; EA at 2-5—2-7. Additionally, approval of the Sand Hill Project is likely to cause the total Altamont-wide repowering program to exceed the 417 MW cap on repowering in PEIR Alternative 1, and possibly to slightly exceed the 450 MW cap for PEIR Alternative 2. EA at 1-4.

Second, several monitoring reports for other repowered wind turbine projects in the Altamont Pass have been published since the County certified the PEIR in November 2014. These monitoring reports include the final three-year report for the Vasco Winds repowering project on the Contra Costa County side of Altamont Pass, and the first two annual monitoring reports for the Golden Hills repowering project on the Alameda County side of Altamont Pass.[5] The first-year monitoring report for the 86 MW Golden Hills Project, which is about 60% of the size of the proposed 144.5 MW Sand Hill Project, is discussed in detail in the Attorney General's October 22, 2018 comment letter. That report, dated February 2018, documented 10-12 golden eagle deaths, 70 red-tailed hawk deaths, and up to 229 documented bat fatalities in the first year of project operations. H.T. Harvey, Feb. 2018 at vii, 20 and 49-52.

In December 2018, the County circulated the draft second-year monitoring report for the Golden Hills Project, which documented fatalities of 14 golden eagles, 30 red-tailed hawks, 25 burrowing owls, and 11 American kestrels in the second year of project operations. H.T. Harvey, Dec. 2018 at iv-v, 24. The report also documented 124 bat fatalities, and extrapolated this number to a project-wide estimate of 500 bat deaths, including an estimated 277 Mexican free-tailed bats and 197 hoary bats, in one year. *Id*. at iv, vi, 22.

The PEIR specifically states that "[p]ostconstruction monitoring, once the turbines are in operation, will provide data to quantify the actual extent of change in avian fatalities from repowering and the extent of avian fatality for projects in the program area, and will contribute to the body of knowledge supporting future analyses." PEIR 3.4-103. The PEIR considered the first-year monitoring results for the Vasco Winds Project for all birds and bats and the second-year Vasco Winds monitoring results only for golden eagles. *See id*. at 3.4-102—103, 3.4-161, E-6, 40, 47. The final three-year report for the Vasco Winds Project was published in 2016, and the two monitoring reports for the Golden Hills Project were published in 2018.

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[5] *See* Brown, K., K. S. Smallwood, J. Szewczak, and B. Karas, 2016, *Final 2012-2015 Report Avian and Bat Monitoring Project Vasco Winds, LLC*. Prepared for NextEra Energy Resources, Livermore, California.

H.T Harvey & Associates, 2018, *Golden Hills Wind Energy Center Post Construction Fatality Monitoring Report: Year 2,* Draft Report Dec. 2018, Project 3926-01. Prepared for Golden Hills Wind, LLC.

H.T Harvey & Associates, 2018, *Golden Hills Wind Energy Center Post Construction Fatality Monitoring Report: Year 1,* Final Report Feb. 2018, Project 3926-01. Prepared for Golden Hills Wind, LLC.

Third, numerous studies relevant to the impacts of and mitigation measures for repowered turbines at Altamont Pass have been published since the PEIR was certified. *See* Appendix A hereto for a partial list of these studies. Of particular relevance are the following reports:

1) Smallwood, K.S., L. Neher and D.A. Bell, *Mitigating Golden Eagle Impacts from Repowering Altamont Pass Wind Resource Area and Expanding Los Vaqueros Reservoir*, Final Report to the East Contra Costa County Habitat Conservancy and Contra Costa Water District, June 17, 2017 (Smallwood 2017).

2) Smallwood, K.S. and L. Neher, *Comparison of Wind Turbine Collision Hazard Model Performance Prepared for Repowering Projects in the Altamont Pass Wind Resources Area*, Jan. 7, 2017, updated Apr. 5, 2018 (Smallwood 2018).

3) Smallwood, K.S., *Addendum to Comparison of Wind Turbine Collision Hazard Model Performance: One-Year Post Construction Assessment of Golden Eagle Fatalities at Golden Hills*, Apr. 10, 2018 (Smallwood 2018 Addendum).

Finally, as noted in the Attorney General's October 22, 2018 comment letter, the California Fish and Game Commission listed the tri-colored blackbird as a threatened species under the California Endangered Species Act in April 2018, and this species and its habitat have been documented to exist in the Sand Hill Project area. *See* Fish and Game Comn. Notice of Findings, Aug. 23, 2018, available at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=161202%20&inline; EA App. B, BRA at 2-12 and 3-6, 4-5.

B. Scope of Impact Analysis for Sand Hill Project SEIR

The SEIR's impact analysis should comprehensively evaluate how the foregoing changed project/changed circumstances and new information affects the avian and bat impact analyses in the PEIR, including a precise evaluation of how the Sand Hill Project's effects on avian and bat resources may differ in both nature and extent than those evaluated in the PEIR.

1. Thresholds of significance

For the same reasons stated in the County's responses to comments on the PEIR, the SEIR should use the same threshold of significance for avian species as in the PEIR of "any level of avian mortality above zero." PEIR 3.4-58, E-4. The SEIR also should examine the 1.679 fatalities/MW/year baseline estimate for impacts to bats in light of new information regarding the increased impacts of fourth-generation turbines on bats. *See id*. at 3.4-132, 136, 139. Any revised threshold of significance must account for the population status of, as well as cumulative effects on, the several bat species found to be killed at repowered turbines at Altamont Pass.

Note, however, that "[c]ompliance with the threshold does not relieve a lead agency of the obligation to consider substantial evidence indicating that the project's environmental effects may still be significant." 14 Cal. Code Regs. § 15064(b)(2). "The determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data" and considering a project's direct, indirect and cumulative effects. *Id*. § 15064(b)(1), (d), (h)(1).

2. General CEQA requirements for project impact analysis

CEQA Guidelines section 15126.2(a) provides that:

> Direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects. The discussion should include *relevant specifics of* the area, the resources involved, physical changes, alterations to ecological systems, and changes induced in … other aspects of the resource base …

14 Cal. Code. Regs. § 15126.2(a) (emphasis added). In *Sierra Club v. County of Fresno*, 6 Cal.5th 502, 241 Cal.Rptr.3d 508 (2018), the California Supreme Court interpreted this section, particularly the "relevant specifics" language, to require an EIR's impact analysis to explain the precise nature *and* magnitude of the project's anticipated effects if it is reasonably scientifically possible to do so, and if it is not scientifically possible, to explain why. *Id*. at 523-24 (note official reporter pin cites not yet available).

The Court held that the EIR also must attempt to explain the connection between a project's raw impacts (e.g. anticipated % increase in emissions or similar projection) and the EIR's ultimate conclusion regarding the significance of these effects on the environment. *Id.* at 524-25. As the Court explained: "[t]he EIR must provide an adequate analysis to inform the public how its bare numbers translate to create potential adverse impacts or it must adequately explain what the agency *does* know and why, given existing scientific constraints, it cannot translate potential … impacts further." *Id*. at 525 (emphasis in original).[6]

The *Sierra Club* Court further held that, generally speaking, the adequacy of an EIR's impact analysis, e.g. "whether a description of an environmental impact is insufficient because it lacks analysis or omits the magnitude of the impact[,] is *not* a substantial evidence question." *Id*. at 519 (emphasis added).[7] Rather, a court will analyze the adequacy of the impact analysis under the "failure to proceed in the manner required by law" standard, under which any error is

[6] Although, given the facts of the case, the Court's analysis was focused on human health impacts, the Court was interpreting the language of section 15126.2(a) more generally, and the Court's reasoning—which was focused on an EIR's overriding purpose as an informational document regarding a project's impacts on the environment—applies equally to an EIR's analysis of other types of project impacts, such as impacts on biological resources. *See Sierra Club*, 241 Cal.Rptr.3d at 524-25.

[7] The Court did note that there are some instances "where the agency's discussion of significant project impacts may implicate a factual question that makes substantial evidence review appropriate," citing "a decision to use a particular methodology and reject another" as an example. *Id*. at 519; *see also id*. at 521.

presumed prejudicial. *Id*. at 519-20. In determining whether the lead agency failed to proceed as required by law, the court will determine whether the EIR includes "detail sufficient to enable those who did not participate in its preparation to understand and to consider meaningfully the issues raised by the proposed project." *Id*. at 520, *quoting Bakersfield Citizens for Local Control v. City of Bakersfield*, 124 Cal.App.4th 1184, 1197 (2004).

3. <u>Changes to PEIR's estimates of annual avian and bat fatalities from repowered turbines</u>

As indicated in the Attorney General's October 22, 2018 comment letter, given the high levels of fatalities for the first two years of operation of the 86 MW Golden Hills Project, the 144.5 MW Sand Hill Project is very likely to cause the 2014 PEIR's annual *Altamont-wide* fatality estimates for golden eagles, and also possibly for red-tailed hawks, to be exceeded. The H.T. Harvey first- and second-year monitoring reports documented up to 12 golden eagle deaths in the first year of operation of the Golden Hills Project, and 14 golden eagle deaths in the second year. The reports also documented 70 red-tailed hawk deaths in the first year of operation and 30 red-tailed hawks in the second year.[8] H.T. Harvey, Feb. 2018 at vii, 20 and 49-52; H.T. Harvey, Dec. 2018 at iv-v, 24. The PEIR, by contrast, estimated that annual golden eagle fatalities would be 5-18 golden eagles and 45 to 111 red-tailed hawks per year Altamont-wide for the 450 MW alternative, and "less than one" to 4 golden eagle deaths, and between 9 to 22 red-tailed hawk deaths, per year for the Golden Hills Project. PEIR 3.4-120, 3.4-123.

Additionally, the FWS commented on the PEIR that "[b]urrowing owl mortalities at the repowered Diablo Winds project [at Altamont Pass] continue to be high. If this mortality rate continues, the local population may be extirpated in the foreseeable future." PEIR at E-37. The second-year monitoring report for Golden Hills documented an additional 25 burrowing owl deaths (although only 4 burrowing owl deaths were documented in the first year). H.T. Harvey, Dec. 2018 at iv; H.T. Harvey, Feb. 2018 at x. The Golden Hills first-year monitoring report and Vasco Winds three-year monitoring report also documented one fatality at each facility of the now state-listed tricolored blackbird. *See* Brown, *et al*., 2016 at 45; H.T. Harvey, Feb. 2018 at vii, 20-21. Finally, the Golden Hills first- and second-year monitoring reports documented one white-tailed kite fatality each year, which, like golden eagle, is a California fully protected species. H.T. Harvey, Feb. 2018 at 20-21; H.T. Harvey, Dec. 2018 at iv, 24; Fish & Game Code § 3511(b)(12). Each of these three species has a high likelihood of occurring on the Sand Hill Project site, and suitable nesting and/or foraging habitat for all of these species exists on or near the site. *See* BRA at 2-12, 3-6, 4-5.

For bats, the H.T. Harvey report documented 229 bat fatalities for the first year of operation of the Golden Hills Project, and 124 documented fatalities and 500 estimated fatalities for the second year. H.T. Harvey, Feb. 2018 at vii, 19-21; H.T. Harvey, Dec. 2018 at iv, vi, 21-24. The PEIR estimated that repowering Altamont-wide for the 450 MW alternative would result in an

[8] Note that the H.T. Harvey second-year monitoring results likely do not account for all of the bird and bat fatalities at the Golden Hills facility due to a reduced search effort approved by the Alameda County Technical Advisory Committee (TAC), at Next Era's request, to limit monitoring costs.

estimated 756 to 1,764 annual fatalities *Altamont-wide*, and only 148 to 347 annual bat fatalities for the Golden Hills Project. PEIR 3.4-139-140. The PEIR estimated bat fatalities would range from 1.68 to 3.92 annual fatalities per MW, while the H.T. Harvey reports found actual bat fatality rates were 5.45 to 5.82 annual fatalities per MW (ranging between 3.70 to 9.75 fatalities/MW/year depending upon the methodology used). *Cf.* PEIR at 3.4-132 and H.T. Harvey, Dec. 2018 at 62.[9]

Because the Sand Hill Project is 60% larger than the Golden Hills Project in terms of MW, it is reasonable to assume, at least for purposes of a very preliminary, rough estimate, that the Sand Hill Project's impacts on birds and bats potentially could be 60% greater than the Golden Hills Project.[10] This would put annual fatalities of golden eagles for the Sand Hill Project *alone* well above the PEIR's Altamont-wide estimates, and the annual fatalities of red-tailed hawks for the Golden Hills and Sand Hill projects combined above the PEIR's Altamont-wide estimates.[11]

Moreover, the Golden Hills monitoring reports indicate that the PEIR substantially underestimated the amount of annual fatalities for golden eagles, red-tailed hawks and bats for the Golden Hills Project, and so the PEIR's approach to project-specific avian and bat impact analyses will need to be updated for the Sand Hill Project going forward. The SEIR must: (1) comprehensively evaluate the new monitoring data and all other studies relevant to avian and bat fatality estimates published since the PEIR, as identified in Appendix A; (2) update the PEIR's impact analyses for avian and bat fatalities in light of this information; and then (3) apply this updated analysis to determine the specific impacts of the Sand Hill Project.

In addition, the SEIR's cumulative impacts analysis must consider the cumulative impacts of the Sand Hill Project on birds and bats when added to the impacts of all operational, approved and anticipated future projects at Altamont Pass, and other cumulative effects on bird and bat species

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[9] Bat fatality rates for the Vasco Winds Project ranged from 3.09 to 3.35 fatalities/MW/year. Brown, *et al*., 2016, Table ES-1 at 7.

[10] Of course, this rough estimate does not account for any differences between the Sand Hill and Golden Hills projects in the size, number or location of turbines, variations in the local topography, or differences in bird and bat utilization, behavior and distribution in the project area. Nor does it account for the confounding factors of interannual and seasonal variation in bird and bat use of various areas of Altamont Pass.

[11] The preliminary, rough estimates for the 144.5 MW Sand Hill Project can be derived and compared to the PEIR estimates as follows. First, the average number of annual golden eagle fatalities for the 86 MW Golden Hills Project is 13 (12 plus 14 divided by 2), multiplied by 1.68 (an approximately 60% increase), which equals 21.8 annual fatalities. The PEIR estimates 5-18 eagles will be taken annually by all 450 MW of repowered projects on the Alameda County side of Altamont Pass. PEIR 3.4-120.

Second, the average number of annual red-tailed hawk fatalities for Golden Hills is 50 (70 plus 30 divided by 2), multiplied by 1.6, which equals 80 annual fatalities. Adding this Sand Hill Project annual fatality estimate of 80 to the average annual fatality estimate for the Golden Hills Project of 50 equals 130 red-tailed hawk fatalities per year. The PEIR estimates 45-111 fatalities per year for the entire 450 MW program. *Id*.

from sources other than wind turbines, as described in Part I above. 14 Cal. Code Regs. § 15130(a)(1). In addition to the Golden Hills Project monitoring data, for example, the 78.2 MW Vasco Winds Project final three-year monitoring report documents that up to 6 golden eagles were killed annually by that project. Brown, *et al.*, 2016 at Table ES-1 at 7. The 38 MW Buena Vista Project monitoring, completed in 2011, documented up to three, and estimated up to eight, golden eagle deaths annually. Insignia, Inc., 2011, *Final Report for the Buena Vista Avian and Bat Monitoring Project*, prepared for Contra Costa County. The 40.8 MW Golden Hills North Project is also operational and has just begun the first year of monitoring. Two other County-approved repowering projects, the 54 MW Summit Wind Project and 19.8 MW Patterson Pass Project, are likely to commence construction soon. The SEIR's cumulative impact analysis will need to account for the current and estimated future impacts of these projects, and any other reasonably foreseeable projects, such as the 80 MW Mulqueeny Ranch and 25.1 MW Rooney Ranch projects. *See* Sand Hill EA at 1-5; *see* 14 Cal. Code Regs. § 15130(b)(1)(A).

The SEIR also must address the impacts on birds and bats of operating turbines for which turbine sizes are up to 1 MW larger, blade lengths are up to 15 feet longer, and the total rotor-swept area up to 2,482 square meters (20%) larger than analyzed in the PEIR. NOP at 4; EA at 1-3. Increases in rotor-swept area has been documented to result in increased impacts to golden eagles. *See* ICF Intl., *Altamont Pass Wind Resource Area Bird Fatality Study, Monitoring Years 2005–2013*, Final Report, Apr. 2016 at 3-22, 4-3.

The PEIR acknowledges that "[t]here is evidence to suggest that larger turbines similar to those used in the Vasco Winds project [2.3 MW] will result in additional increases in bat fatality rates," and that "all available data suggest that repowering would result in substantial increases in bat fatalities." PEIR 3.4-138—139 and *id*. at 3.4-132—133. "Taller turbines have been documented to kill more bats" because, among other reasons, the "increased height of fourth-generation turbines [such as those proposed for the Sand Hill Project] puts the rotor-swept area into bat flight paths." *Id*. at 3.4-132, 139. The SEIR must evaluate and attempt to quantify the anticipated increased bat fatalities that are likely to be caused by operation of the Sand Hill Project, including cumulative effects and the effects on the populations of affected bat species, to the extent scientifically possible in light of the best available current information.

4. <u>Micro-siting analysis and effects of large-scale grading on such analysis</u>

The PEIR accurately states that "[s]iting of turbines—using analyses of landscape features and location-specific bird use and behavior data to identify locations with reduced collision risk—may result in reduced fatalities (Smallwood et al. 2009)." PEIR 3.4-109. Accordingly, Mitigation Measure Bio-11b in the PEIR requires project proponents to prepare a micro-siting analysis "to select turbine locations to minimize potential impacts on bird and bat species." *Id*. This analysis must utilize the best available scientific information as well as site-specific field analysis, including analysis of the local topography and pre-construction field studies of bird and bat use, behavior *and* distribution in the project site. *Id*.

The PEIR states that, in addition to existing studies, siting guidelines, monitoring reports and site-specific field analysis, "project proponents will use the results of previous [repowering project] siting efforts to inform the analysis and siting methods as appropriate such that the science of siting continues to be advanced." *Id*. The PEIR contains similar micro-siting requirements for bats, although the science for bat micro-siting is still in its infancy. *Id*. at 3.4-133. The bat micro-siting analysis must incorporate site-specific bat use, habitat and roosting surveys of the project site in accordance with Mitigation Measure Bio-12a (discussed in Part III.B.5 below), as well as bat use and monitoring data from other projects at Altamont Pass. *See id*.

Previous micro-siting studies for repowered turbines at Altamont Pass that should be considered in the SEIR are listed in Appendix A.[12] As indicated in Smallwood 2018, these micro-siting studies have improved significantly since the PEIR was certified, due to incorporation of substantial additional sources of data obtained from studies conducted with mitigation funds from the December 2010 Next Era-Attorney General-Audubon settlement agreement, as amended in May 2012 ("Next Era Settlement"), and other sources. Smallwood 2018 at 3-5; *see also* Smallwood 2017 at 7-10, 77-94.

The micro-siting studies indicate that terrain features that pose the greatest risk to raptors generally include "ridge saddles, breaks in slope, steep slopes, and valley features such as canyons and ravines." Smallwood 2018 at 3; *see also* Smallwood 2017 at 43-44, 81 (describing other terrain features more strongly associated with raptor-wind turbine collisions). Smallwood 2018 states that the latest version of the model, developed for the Summit Winds Project at Altamont Pass, appears to perform the best for three of the four focal raptor species (golden eagle, red-tailed hawk, and American kestrel), and could be improved, with a few minor modifications, also to perform well for the fourth focal raptor species (burrowing owl). Smallwood 2018 at 11.

As required by the PEIR, the SEIR should utilize the latest version of the micro-siting model incorporating the best available scientific information for its impact analysis, using field analysis of actual topographic conditions and bird and bat use, behavior and distribution surveys in the project area, as required by the PEIR. *See* Smallwood 2017 at 92 ("[m]ap-based collision hazard maps need to be interpreted carefully, meaning the hazards of specific terrain and wind situations—ridge saddles, apices of southwest and northwest-facing concave slopes, and breaks in slope—should always trump model predictions") and *id*. at 94.[13]

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[12] The turbine micro-siting model for Altamont Pass is explained in detail in Smallwood, K. S., *Report of Altamont Pass Research as Vasco Winds Mitigation*, Report to NextEra Energy Resources, California Attorney General, Audubon Society, East Bay Regional Park District, July 15, 2016 (Smallwood 2016b): Part II: Smallwood, K.S and L. Neher, *Siting Wind Turbines to Minimize Raptor Collisions at Repowering Projects, Altamont Pass Wind Resource Area*, pp. 78-128.

[13] *See also:* Smallwood 2016b, Part I: Smallwood, K.S., *Nocturnal Behavior of Burrowing Owls, Other Birds and Bats* at 4-77;

Also, in light of the new information from the Golden Hills monitoring reports regarding the higher than anticipated impacts of large wind turbines on birds and bats, the initial micro-siting analysis should be included as an appendix to the draft SEIR and not deferred to after certification of the SEIR as with previous repowering projects at Altamont Pass. This is feasible and necessary to facilitate accurate analysis of, and to enable adequate public review and comment on, the "relevant specifics" of the Sand Hill Project. *See* 14 Cal. Code. Regs. § 15126.2(a).

The adequacy of the micro-siting process for the Sand Hill Project necessarily will affect the accuracy of the SEIR's analysis of the extent of the project's unavoidable site-specific impacts on avian resources requiring compensatory mitigation, monitoring and adaptive management, because micro-siting is currently the best-known measure for avoiding or reducing ongoing avian fatalities from operation of wind turbines, besides turbine shut down or curtailment. PEIR at E-35. The SEIR's micro-siting analysis also should include a discussion of the "trade-off[s] of prioritizing wind turbine siting to maximize golden eagle protection," since, according to Dr. Smallwood, "optimizing siting for eagles [using the micro-siting models] increases the likelihood of killing more birds of other species." Smallwood 2018 at 11.

Finally, the SEIR's micro-siting analysis must account for the substantial amount of grading for turbine pads and roads necessary to site large modern turbines, which affects the accuracy of the analysis due to the resulting significant changes in site topography. Dr. Smallwood notes that:

> [a]n important caveat related to the model projections [for] repowered wind projects is that the models were not adjusted for changes to the landscape caused by grading for access roads and wind turbine pads…. The pads created for some of the Vasco Winds [2.3 MW] turbines cut deeply into hill slopes, sometimes creating new breaks in slope, depressions on the prevailing downwind aspects of ridge or hill structures, and enhanced ridge saddles. The depressions on the prevailing downwind aspects of ridge or hill structures forces birds traveling with or against the wind to fly higher off the ground to clear the remaining ridge or hill structure upwind of the turbine. This forcing effectively reduces the distance between the ground and the low reach of the turbine rotor, thereby increasing collision risk [citation omitted]. We did not anticipate these types of changes to the landscape when developing collision hazard models.

Smallwood, K. S., and L. Neher, 2016, *Bird and Bat Impacts and Behaviors at Old Wind Turbines at Forebay, Altamont Pass Wind Resource Area*, Report CEC-500-2016-066, California Energy Commission (both documenting burrowing owl and bat use and behavior surveys at Altamont Pass) (Smallwood 2016a); and

Johnston, D.S., *et al*., 2013, *Bird and Bat Movement Patterns and Mortality at the Montezuma Hills Wind Resource Area*, CEC-500- 2013- 015, Report to the California Energy Commission (documenting, *inter alia*, bat wind turbine passage rates at the Montezuma Hills Project in Solano County).

Smallwood 2017 at 66. The need to account for the effects of grading in the turbine micro-siting process is also discussed in detail in the Smallwood 2018 Addendum. The turbine micro-siting analysis also must be conducted using the most up-to-date engineering designs for the project.

5. Need for nesting and roosting surveys for golden eagles and other raptors, tri-colored blackbirds, and bats to inform impact and siting analyses

PEIR Mitigation Measure Bio-11b states that:

> [p]roject proponents will also collect and utilize additional field data as necessary to inform the siting analysis for golden eagle. As required in Mitigation Measure Bio-8a, surveys will be conducted to locate golden eagle nests within 2 miles of proposed project areas. Siting of turbines within 2 miles of an active or alternative golden eagle nest or active golden eagle territory will be based on a site-specific analysis of risk based on the estimated eagle territories, conducted in consultation with USFWS.

PEIR 3.4-109. These surveys must be conducted during the golden eagle breeding season. *Id.* at 3.4-90.[14] Mitigation Measure Bio-8a also requires nesting surveys to be conducted within one mile of the project site for raptors other than golden eagles, and within 50 feet of proposed work areas for tree/shrub- and ground-nesting migratory birds such as the now-threatened tri-colored blackbird, and burrowing owl. *Id.*[15]

PEIR Mitigation Measure Bio-12a contains similar requirements for identification of bat roosting habitat in the project area, to be conducted over several days and at different times of the

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[14] For discussions of recent golden eagle nesting and other surveys at Altamont Pass and across the Diablo Range, *see:*

Weins, D., *et al*., 2018, *Spatial Patterns in Occupancy and Reproduction of Golden Eagles During Drought: Prospects for Conservation in Changing Environments*, Ornithological Applications, 120:106-124;

Kolar, P.S., Weins, D., 2017, *Distribution, Nesting Activities, and Age-Class of Territorial Pairs of Golden Eagles at the Altamont Pass Wind Resource Area, California, 2014–16*, United States Geological Survey, Open-File Report 2017–1035; and

Weins, D., *et al*., 2014, *Estimation of Occupancy, Breeding Success, and Abundance of Golden Eagles (Aquila chrysaetos) in the Diablo Range, California*, United States Geological Survey, Open File Report 2015-1039.

[15] For a published discussion of burrowing owl nesting colonies at Altamont Pass based on comprehensive field surveys in 2011, *see* Smallwood, K.S., *et al*., 2013, *Nesting Burrowing Owl Density Abundance in the Altamont Pass Wind Resource Area, California*, Wildlife Society Bulletin 37(4):787-795.

day/night and year as necessary. PEIR 3.4-127—128.[16] PEIR Mitigation Measure Bio-14a similarly provides that "[t]o generate site-specific 'best information' to inform turbine siting and operation decisions, a bat habitat assessment and roost survey will be conducted in the project area to identify and map habitat of potential significance to bats, such as potential roost sites … and water sources." *Id*. at 3.4-133.

In order to provide a reasonable assessment of the nature and extent of the Sand Hill Project's impacts on special status bird and bat species and their habitat, and to adequately inform turbine micro-siting, the SEIR should provide maps and discussion of the locations and quality of nesting, roosting and foraging habitat for all raptors, other special status bird species such as the newly-listed tri-colored blackbird, and bats. These maps should be based on protocol-level surveys. The maps should be overlain with the proposed wind turbine locations and accounted for in the bird and bat micro-siting analyses for this project. The SEIR should then analyze the extent to which construction and operation of the project, as appropriately micro-sited based on the best available science, will adversely affect nesting, roosting and foraging sites for each of the four focal raptor species, other raptors and special status bird species, and affected bat species.

IV. PROJECT ALTERNATIVES

CEQA Guidelines section 15126.6(a) provides that "[a]n EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." 14 Cal. Code Regs. § 15126.6(a). The "reasonable range of potentially feasible alternatives" must be selected on the basis of "foster[ing] informed decision-making" and "meaningful public participation." *Id.* § 15126.6(a), (f).

The EIR's alternatives discussion must "focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives *would impede to some degree the attainment of the project objectives, or would be more costly*." *Id*. § 15126.6(b) (emphasis added); *see also id*. § 15126.6(c), (f).[17] The EIR must "include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project." *Id*. § 15126.6(d). The EIR also must discuss the lead agency's reasoning for selecting the alternatives to be discussed in detail, and the reasons for rejecting other alternatives as infeasible. *Id*. § 15126.6(a), (c).

[16] Note that the bat roosting surveys conducted for the Sand Hill Project by ICF International in September 2018 are likely insufficient to meet these requirements, as it appears that the extent of the surveys included simply driving the project site and inspecting rock outcroppings and other areas over a two-day period. EA App. B, BRA at 2-2.

[17] Thus, the NOP's statement that "[c]omments submitted should focus on mitigation measures or alternatives that may be less costly or have fewer environmental impacts while achieving similar… objectives" (NOP at 6) is not entirely accurate.

The range of alternatives discussed in an EIR also must include the "no project" alternative. *Id.* § 15126.6(e)(1). The purpose of such alternative "is to allow decisionmakers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project." *Id*. The "no project" analysis must discuss existing conditions at the time of publication of the NOP and:

> what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans … If the environmentally superior alternative is the "no project" alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives.

Id. § 15126.6(e)(2). For site-specific development projects, the "no project" discussion must "compare the environmental effects of the property remaining in its existing state against environmental effects which would occur if the project is approved." *Id*. § 15126(e)(3)(B). If project disapproval "would result in predictable actions by others, such as the proposal of some other project," the no project alternative should discuss this potential consequence. *Id*.

Here, the SEIR must meaningfully consider a reasonable range of alternatives that will avoid or reduce the otherwise unavoidable avian and bat fatalities of the project as proposed, including the no project alternative, reduced project size (number and size of turbines), various turbine micro-siting arrays to avoid and minimize impacts to all four focal raptor species and bats, and other reasonable and feasible alternatives.[18]

V. <u>PROJECT MITIGATION MEASURES</u>

A. General Requirements for CEQA Mitigation Measures

Finally, CEQA Guidelines section 15126.4(a)(1) sets forth the basic CEQA requirements for mitigation measures in an EIR. An EIR must "describe feasible measures which could minimize significant adverse impacts," distinguishing between measures proposed by the project proponent versus other measures proposed by the lead agency and responsible or trustee agencies or other persons. 14 Cal. Code Regs. § 15126.4(a)(1) & (a)(1)(A). "Mitigation measures must be fully enforceable through permit conditions, agreements, or other legally-binding instruments." *Id*. § 15126.4(a)(2). An EIR must include facts and analysis "to support the inference that the mitigation measures will have a quantifiable 'substantial' impact on reducing

[18] We note that the County did not specifically approve either the 417 or 450 MW alternatives for repowering Altamont-wide when it certified the PEIR in 2014, and thus the County could feasibly determine to reduce the total allowable MW on the Alameda County side of Altamont Pass to 417 MW without reopening the PEIR. The FWS previously recommended that "the County approve an alternative that would limit the overall wind energy development in the [Altamont Pass] to ensure ongoing take of golden eagles does not exceed 5% of the local area golden eagle population." PEIR at E-35–36. The FWS also recommended a moratorium on wind development on undisturbed prime grassland habitat "until such time that ongoing take can be substantially reduced to a more sustainable level." *Id*. at E-36.

[a project's] adverse effects," although the measures need not necessarily reduce an impact to below the threshold of significance. *Sierra Club,* 241 Cal.Rptr.3d at 526.

In general, "mitigation measures shall not be deferred until some future time." 14 Cal. Code Regs. § 15126.4(a)(1)(B). The specific details of mitigation measures may only be deferred to after project approval in the following circumstances: (1) "it is impractical or infeasible" to include such details in the EIR, and the lead agency does all of the following: (2) "commits itself to the mitigation," (3) "adopts specific performance standards the mitigation will achieve," and (4) identifies the actions "that can feasibly achieve that performance standard and that will considered, analyzed, and potentially incorporated in the mitigation measure." *Id*.

Compliance with another permit process, such as the FWS's federal golden eagle take permit process as currently provided in the PEIR (*see* PEIR 3.4-115), "may be identified as mitigation if compliance would result in implementation of measures that would be reasonably expected, based on substantial evidence in the record, to reduce the significant impact to the specified performance standards." 14 Cal. Code Regs. § 15126.4(a)(1)(B). This language requires an analysis of the extent to which the FWS program would satisfy the mitigation measures and any performance standards in the PEIR and SEIR.

B. Mitigation Measures to Be Evaluated in the SEIR

Here, the SEIR must re-evaluate the suite of mitigation measures in the PEIR for the impacts of construction and operation of repowering projects on avian and bat resources and upgrade these mitigation measures in light of the changed project/changed circumstances and new information pertaining to the Sand Hill Project, and the SEIR's analysis of any changed or increased effects on such resources due to this project. The suite of mitigation measures should include, but is not necessarily limited to, the following.

1. <u>Turbine micro-siting plans for birds and bats</u>

The SEIR should include more stringent turbine micro-siting requirements for the Sand Hill Project than are currently included in the PEIR (such as prohibiting turbines in zones identified as highly dangerous to birds and bats) and requiring a reduction in project size (area or number/size of turbines) if not possible to avoid these zones. *See* PEIR 3.4-109—110, 3.4-133. The SEIR also should require that as-built project designs not differ substantially from designs used for turbine micro-siting.

As previously noted, draft bird and bat turbine micro-siting plans should be included as an appendix to the draft SEIR for public review, as it is not "impractical or infeasible" to do so. 14 Cal. Code Regs. § 15126.4(a)(1)(B). However, the SEIR still should require Alameda County Technical Advisory Committee (TAC) review and County planning staff approval of the final Sand Hill Project bird and bat micro-siting plans prior to project operation, as required under the PEIR. PEIR 3.4-109, 3.4-133.

2. Compensatory mitigation plan

The compensatory mitigation program in the PEIR should be updated for the Sand Hill Project to reflect the best available scientific information regarding the nature and extent of unavoidable impacts of repowering projects on birds and bats. *See* PEIR 3.4.113—116. Compensatory mitigation should be designed to provide complete, quantified and effective compensation for all anticipated unavoidable impacts of the Sand Hill Project. The PEIR itself states that "[t]he County recognizes that the science of raptor conservation and the understanding of wind-wildlife impacts are continuing to evolve and that the suite of available compensation options may consequently change over the life of proposed projects." *Id*. at 3.4-113.

The PEIR's compensatory mitigation program is based on outdated fatality estimates using only the first year (or two, for golden eagles only) of monitoring for the Vasco Winds Project. *Id*. at 3.4-114; E-11—12. It is also based on outdated estimates of compensatory mitigation costs of $580 per raptor killed (which in turn is based on undocumented average raptor rehabilitation costs at one facility), that are wholly insufficient to provide adequate compensatory mitigation. *Id*. at 3.4-115. PEIR Mitigation Measure Bio-14e also requires the project proponent to pay the full costs of rehabilitating injured bats by licensed wildlife care facilities. PEIR at 3.4-138. Thus, the SEIR likewise must include an updated analysis of these costs.

This updated analysis is very likely to necessitate a substantial increase in compensatory mitigation measures and fees than are currently provided in the PEIR. The type and amount of compensatory mitigation must be developed based on a quantifiable resource equivalency analysis or other formula, such as that provided in the Next Era Settlement, and specify the specific preferred measures to be implemented rather than just providing a range of possible future options as currently provided in the PEIR.[19] *Cf*. PEIR at 3.4-113—116.

Selected compensatory mitigation measures must provide meaningful mitigation for ongoing unavoidable bird deaths. Such measures could include protection of known raptor nesting and foraging habitat through land acquisition or conservation easements (similar to that provided in the Next Era Settlement and accompanying June 2012 memorandum of understanding between the settling parties and East Bay Regional Park District—both included on the CD submitted herewith), retirement of wind rights, and programs to eliminate rodenticide use and eliminate ground squirrel control, among other options. In addition, PEIR Mitigation Measure Bio-9

[19] The 2010 Next Era Settlement provided for a $10,500 per MW compensatory mitigation fee, to be divided equally between conservation measures for raptors and bats, and scientific research on the effects of wind turbines on birds and bats, in the Altamont Pass region. However, given that the agreement is now almost ten years old, this amount also must be updated, for purposes of the SEIR, to reflect the most current scientific information, inflation costs, and other considerations.

requires compensation for permanent loss of occupied burrowing owl habitat and loss of grassland foraging habitat for other special-status bird species. PEIR 3.4-94—95.

The draft compensatory mitigation plan also should be included in SEIR and not delayed to a later date following project approval, as currently provided in the PEIR. However, the SEIR still should require TAC and County staff review and approval of the final compensatory mitigation plan prior to prior to the commercial operation date (COD) of the project, as required under the PEIR. *See* PEIR 3.4-114. Finally, the SEIR also should include measures to ensure payment of compensatory mitigation fees within 90 days of project operation, and sufficient TAC oversight of implementation of the compensatory mitigation program within one year of project operation, similar to those provided in the Next Era Settlement. *See id.*; Next Era Settlement and MOU.

3. Post-construction project monitoring program

The PEIR's post-construction monitoring program for birds and bats (PEIR 3.4-111—113, 3.4-133—135) must be updated and improved for the Sand Hill Project in light of the most recent monitoring data for repowering projects, and new studies identifying improved monitoring methods and protocols, such as integrated detection trials. *See id*. at 3.4-112 ("[t]he estimation of detection probability is a rapidly advancing field") and *id*. at 3.4-119 (post-construction monitoring results "will provide data to quantify the actual extent of … avian fatality for projects in the program area and will contribute to the body of knowledge supporting future analyses"); Smallwood, K. S., *et al*., *Estimating Wind Turbine Fatalities Using Integrated Detection Trials*, 2018, Journal of Wildlife Management 82:1169-1184.

Pertinent new information includes recommendations of the TAC, and the scientific studies and post-PEIR monitoring reports listed in Appendix A hereto (some of which are included on the accompanying CD). For example, the H.T. Harvey Golden Hills second-year monitoring report describes the significantly increased efficiency of skilled dog detection teams in identifying fatalities of small birds and bats, and also concludes that a 28-day versus a 7-day search interval appears to result in an underestimation of fatality rates for small birds and bats. H.T. Harvey, Dec. 2018, at iv-v, x-xi, 59-60; *see also* Smallwood, K. S., D.A. Bell, and S. Standish, 2018, *Skilled Dog Detections of Bat and Small Bird Carcasses in Wind Turbine Fatality Monitoring*, Report to East Bay Regional Park District.

Additional and more effective monitoring requirements could include, for example: (1) monitoring for more than three years; (2) monitoring of all turbines on a weekly basis; (3) monitoring of a biologically appropriate area for each turbine, and not just turbine pads, that will ensure detection of the vast majority of bird and bat fatalities; (4) use of integrated detection trials; (5) required use of skilled dog detection teams; and (6) use of monitoring methods that may be more effective based on the latest science, such as thermal imaging. Smallwood 2016a discusses the advantages of thermal imaging for monitoring bats, particularly at night and during the fall migration season. *See* Smallwood 2016a at 167-68. The SEIR should include clear deadlines and time frames for all required monitoring actions, and should enforce the existing PEIR requirement for TAC meetings to be held every six months to review project monitoring data and other information. *Id.* at 3.4-112, 3.4-133.

The draft monitoring program also should be included in the SEIR and not delayed to a later date following project approval. However, as with the micro-siting and compensatory mitigation plans, the final monitoring plan still should be reviewed by the TAC and approved by County staff prior to project operation, as currently required under the PEIR. *See* PEIR 3.4-111—113, 3.4-134. In addition, as under the PEIR, monitoring should commence upon the project COD, annual monitoring reports and a final three-year report should be produced for TAC and public review, and raw monitoring data should be made publicly available. *Id*.

4. Adaptive management program for project operations

The PEIR's adaptive management programs for birds and bats must be significantly strengthened for the Sand Hill Project to require more immediate, significant reductions in identified fatalities at offending turbines or, if necessary, project-wide curtailment of turbines during certain times of the day/night or year, if anticipated to significantly reduce unavoidable effects on birds and/or bats. PEIR 3.4-116—118, 3.4-135—137. Under the PEIR's adaptive management program, although it is not entirely clear, the project proponent arguably need not implement any adaptive management measures until after the initial three-year monitoring program has concluded. *Id.* at 3.4-111, 3.4-116.

Further, the PEIR provides an incremental, "stepped" approach to adaptive management, under which the least restrictive (and likely least effective) adaptive management measure(s) are implemented first and "the results are monitored for success or failure for a year, and additional adaptive measures are [then] added as necessary, followed by another year of monitoring, until … the estimated fatalities are below the baseline." *Id*. at 3.4-117. Seasonal or real-time turbine curtailment or shut down and changes in turbine cut-in speed, which currently are considered to be the most effective measures for avoiding or reducing fatalities once turbines are installed, are the last in line for consideration in this lengthy and fairly cumbersome process. *Id*. at 3.4-117—118.

In light of the new monitoring data showing significantly higher than estimated avian and bat fatalities from repowered projects, this adaptive management program is too protracted and lenient to result in timely and meaningful reductions in identified fatalities. The PEIR acknowledges the need to update adaptive management strategies in light of the best available scientific information. *See* PEIR at 3.4-116—117, 3.4-135. More stringent adaptive management measures could include turbine curtailment or shut downs during specific times of the day/night or months of the year when raptors, special status bird species or bats are more likely to be present, real time turbine curtailment using the latest detection technology, implementing changes in turbine cut in speed upon specified and determinable triggers, and other effective and legally-enforceable measures after one year of project monitoring.[20] Adaptive management measures must be based on a scientific study design tied to biologically-based, and—to the extent scientifically possible—quantifiable, objectives and adaptive management triggers. *See* Sinclair, K. and E. DeGeorge, 2016, *Framework for Testing the Effectiveness of Bat and Eagle Impact-Reduction Strategies at Wind Energy Projects*, Technical Report NREL/TP-5000-65624, National Renewable Energy Laboratory.

The trigger for adaptive management measures should not be based on exceedance of an outdated and debatable pre-repowering baseline as under the PEIR (PEIR 3.4-111—112, E-5—6; *see* H.T. Harvey, Dec. 2018 at 64-65; PEIR at E-124), but rather based on whether actual project operations exceed projected project-specific annual fatality estimates for one or more focal raptor species, other birds of special concern, or affected bat species by a specified degree after one year of monitoring.[21] Adaptive management measures also should be triggered when it is determined, again after one year of monitoring, that one or more turbines are causing a "disproportionate impact." The SEIR should specifically define "disproportionate impact" as a significantly higher fatality rate than other turbines in the same facility, e.g. X additional fatalities (as determined based on the biology and population status of the species), for one or more focal raptor species, other raptors or bird species of special concern, or affected bat species.

Smallwood 2017 contains a description of the bird behavioral surveys that were performed using mitigation funds from the Next Era Settlement, which contains at least some information as to the months of the year, times of day, wind speeds, etc. which corresponded with a greater number of wind turbine collisions for focal raptor species. *See* Smallwood 2017 at 40-42. In addition, several other reports contain information regarding recent bat (and bird) use and

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[20] Indeed, the SEIR should consider immediate, "real-time" turbine curtailment upon detection of nearby birds and bats, using the latest "detect and deter or curtail" technology as a primary mitigation measure, rather than a last resort for adaptive management as currently provided under the PEIR. *See* PEIR 3.4-118, 3.4-136—137 (Avian Adaptive Management Measure 7 and Bat Adaptive Management Measure 8). For the latest research on this emerging technology: *see* H.T. Harvey & Assoc., 2018, *Evaluating a Commercial-Ready Technology for Raptor Detection and Deterrence at a Wind Energy Facility in California*, American Wind and Wildlife Inst. Technical Report; McClure, C.J. *et al*., 2018, *Automated Monitoring for Birds in Flight: Proof of Concept with Eagles at a Wind Power Facility*, Biological Conservation 224 (2018) at 26–33.

[21] The PEIR's current trigger for bat adaptive management measures (exceedance of 1.679 fatalities/MW/year) may be appropriate as it is designed to be conservative and therefore more protective of bats, but also should evaluated in light of the most recent bat population, use and behavior studies and monitoring data. *See* PEIR at 3.4-136.

behavior surveys at repowered and non-repowered turbines. *See* Brown, *et al*. 2016 at 25-33, 103-04; Smallwood 2016a at 139-40, 166-68; Smallwood 2016b at 4-77 and Johnston 2013). These and other studies may be helpful in updating the PEIR adaptive management program for purposes of the SEIR. The SEIR also should re-examine the specified changes in turbine cut-in speeds in light of the most recent data on this topic. PEIR 3.4-118, 3.4-136.

Finally, the updated draft project-specific avian and bat adaptive management program must be included in the SEIR for public review and comment, and not delayed to a later date following project approval as under the PEIR. And as with the turbine micro-siting, compensatory mitigation and monitoring plans, the TAC and County staff still should review and approve and oversee implementation of the final avian and bat adaptive management programs, as currently provided in the PEIR. PEIR 3.4-116—117, 3.4-135—136. And like the project monitoring program, the SEIR should contain specific deadlines and time frames for preparation, approval, implementation and monitoring of the final project-specific adaptive management plan.

5. <u>Avian protection plan</u>

As discussed, the SEIR must include a draft avian protection plan for the Sand Hill Project (which, under PEIR Mitigation Measure Bio-11a, must incorporate the avian micro-siting, compensatory mitigation and monitoring plans), instead of being deferred to after project approval, as currently provided in the PEIR. *See* PEIR 3.4.109—116. The draft bat micro-siting and monitoring plans required by PEIR Mitigation Measures Bio-14a and Bio-14b also should be included in the PEIR. *Id*. at 3.4-133—135. This is feasible and necessary to adequately inform the public and to enable an adequate and accurate evaluation of whether and to what extent the project's adverse effects on avian and bat resources have been avoided or minimized. This also is necessary to assist in quantifying the remaining unavoidable adverse effects to accurately determine the initial required amount of compensatory mitigation and an appropriate suite of adaptive management measures and triggers.

6. <u>Other measures</u>

Finally, the PEIR's measures for mitigating impacts to ground nesting birds will need to be updated. The California Department of Fish and Wildlife's (CDFW's) October 25, 2018 comment letter on the Sand Hill Project states that "CDFW considers the PEIR's analysis and mitigation measures (measures Bio 8 and 9), which are based primarily on loss of habitat, as inadequate" in light of the recent listing of tri-colored blackbird. CDFW Oct. 25, 2018 ltr. at 3.

CONCLUSION

We appreciate the opportunity to submit and the County's consideration of these scoping comments. If you have any questions concerning this letter, please do not hesitate to contact me.

Sincerely,

(ORIGINAL SIGNED BY)

TARA L. MUELLER
Deputy Attorney General

For XAVIER BECCERA
Attorney General

APPENDIX A:
PARTIAL LIST OF STUDIES AND MONITORING REPORTS RELEVANT TO IMPACTS OF AND MITIGATION MEASURES FOR REPOWERING PROJECTS AT ALTAMONT PASS

List of Studies and Monitoring Reports Relevant to Bird and Bat Fatalities at Altamont Pass

Bell, D.A. 2017. GPS satellite tracking of golden eagles (Aquila chrysaetos) in the Altamont Pass Wind Resource Area (APWRA) and the Diablo Range: final report for phases 1 and 2 of the NextEra energy settlement agreement: main report—active birds. Report to NextEra Energy Resources, California Attorney General, Audubon Society, East Bay Regional Park District.

Bell, D.A. 2017. GPS satellite tracking of golden eagles (Aquila chrysaetos) in the Altamont Pass Wind Resource Area (APWRA) and the Diablo Range: final report for phases 1 and 2 of the NextEra energy settlement agreement: supplement—inactive birds. Report to NextEra Energy Resources, California Attorney General, Audubon Society, East Bay Regional Park District.

Bell, D. A., and K.S. Smallwood. 2010. Birds of prey remain at risk. Science 330:913.

Brown, K., K. S. Smallwood, J. Szewczak, and B. Karas. 2016. Final 2012-2015 report avian and bat monitoring project Vasco Winds, LLC. Prepared for NextEra Energy Resources, Livermore, California.

Brown, K., K. S. Smallwood, J. Szewczak, and B. Karas. 2014. Final 2013-2014 annual report avian and bat monitoring project Vasco Winds, LLC. Prepared for NextEra Energy Resources, Livermore, California.

Brown, K., K. S. Smallwood, and B. Karas. 2013. Final 2012-2013 annual report avian and bat monitoring project Vasco Winds, LLC. Prepared for NextEra Energy Resources, Livermore, California.

H.T. Harvey & Associates. 2018. Golden Hills Wind Energy Center post construction fatality monitoring report: Year 2, draft report Dec. 2018, Project 3926-01. Prepared for Golden Hills Wind, LLC, Livermore, California.

H.T. Harvey & Associates. 2018. Golden Hills Wind Energy center post construction fatality monitoring report: Year 1, final report Feb. 2018, Project 3926-01. Prepared for Golden Hills Wind, LLC, Livermore, California.

H.T. Harvey & Associates. 2018. Evaluating a commercial-ready technology for raptor detection and deterrence at a wind energy facility in California. American Wind and Wildlife Inst. Technical Report, Washington, D.C.

Hunt, W.G. *et al*. 2017. Quantifying the demographic cost of human-related mortality to a raptor population. Plos One, DOI:10.1371/journal.pone, 0172232

ICF International. 2016. *Altamont Pass Wind Resource Area Bird Fatality Study, Monitoring Years 2005–2013*, Final Report, Apr. 2016, prepared for Alameda County Community Development Agency.

Johnson, D. H., S. R. Loss, K. S. Smallwood, W. P. Erickson. 2016. Avian fatalities at wind energy facilities in North America: A comparison of recent approaches. Human–Wildlife Interactions 10(1):7-18.

Johnston, D.S., J. Howell, *et al*. 2013. Bird and bat movement patterns and mortality at the Montezuma Hills Wind Resource Area, CEC-500- 2013- 015 . Report for the California Energy Commission prepared by H.T. Harvey & Assoc., Los Gatos, CA.

Kolar, P.S., Weins, D. 2017. Distribution, nesting activities, and age-class of territorial pairs of golden eagles at the Altamont Pass Wind Resource Area, California, 2014–16. United States Geological Survey Open-File Report 2017–1035.

Köppel, J., Ed. 2017. Wind energy and wildlife impacts: proceedings from the CWW2015 Conference. Springer, Cham, Switzerland.

McClure, C.J. *et al*. 2018. Automated monitoring for birds in flight: proof of concept with eagles at a wind power facility. Biological Conservation 224 (2018) 26–33.

Mete, A., N. Stephenson, K. Rogers, M. G. Hawkins, M. Sadar, D. Guzman, D. A. Bell, J. Shipman, A. Wells, K. S. Smallwood, and J. Foley. 2014. Emergence of knemidocoptic mange in wild golden eagles (Aquila chrysaetos) in California. Emerging Infectious Diseases 20(10):1716-1718.

Milsap, B.A, E. R. Bjerre, *et al*. 2016. Bald and golden eagles: population demographics and estimation of sustainable take in the United States. Report prepared for U.S. Fish and Wildlife Service, Division of Migratory Bird Management.

Perrow, M., Ed., Wildlife and Wind Farms - Conflicts and Solutions, Volume 2. Pelagic Publishing, Exeter, United Kingdom. 2017. www.bit.ly/2v3cR9Q.

Sadar, M. J., D. S.-M. Guzman, A. Mete, J. Foley, N. Stephenson, K. H. Rogers, C. Grosset, K. S. Smallwood, J. Shipman, A. Wells, S. D. White, D. A. Bell, and M. G. Hawkins. 2015. Mange caused by a novel micnemidocopte mite in a golden eagle (Aquila chrysaetos). Journal of Avian Medicine and Surgery 29(3):231-237.

Sinclair, K. and E. DeGeorge. 2016. Framework for testing the effectiveness of bat and eagle impact-reduction strategies at wind energy projects. Technical Report NREL/TP-5000-65624, National Renewable Energy Laboratory, Golden, Colorado.

Smallwood, K. S., D. A. Bell, E. L. Walther, E. Leyvas, S. Standish, J. Mount, B. Karas. 2018. Estimating wind turbine fatalities using integrated detection trials. Journal of Wildlife Management 82:1169-1184.

Smallwood, K. S., D.A. Bell, and S. Standish. 2018. Skilled dog detections of bat and small bird carcasses in wind turbine fatality monitoring. Report to East Bay Regional Park District, Oakland, California.

Smallwood, K. S., L. Neher, and D. A. Bell. 2017. Mitigating golden eagle impacts from repowering Altamont Pass Wind Resource Area and expanding Los Vaqueros Reservoir. Report to East Contra Costa County Habitat Conservation Plan Conservancy and Contra Costa Water District.

Smallwood, K. S. 2017. Long search intervals under-estimate bird and bat fatalities caused by wind turbines. Wildlife Society Bulletin 41:224-230.

Smallwood, K. S, L. Neher. 2016a. Bird and bat impacts and behaviors at old wind turbines at Forebay, Altamont Pass Wind Resource Area. Report CEC-500-2016-066, California Energy Commission Public Interest Energy Research Program, Sacramento, California.

Smallwood, K. S. 2016b. Report of Altamont Pass research as Vasco Winds mitigation. Report to NextEra Energy Resources, California Attorney General, Audubon Society, East Bay Regional Park District.

Smallwood, K. S. 2013. Comparing bird and bat fatality-rate estimates among North American wind-energy projects. Wildlife Society Bulletin 37:19-33 + Online Supplemental Material.

Smallwood, K. S., L. Neher, J. Mount, and R. C. E. Culver. 2013. Nesting burrowing owl abundance in the Altamont Pass Wind Resource Area, California. Wildlife Society Bulletin: 37:787-795.

Smallwood, K. S., D. A. Bell, B. Karas, and S. A. Snyder. 2013. Response to Huso and Erickson comments on novel scavenger removal trials. Journal of Wildlife Management 77: 216-225.

Smallwood, K. S., D. A. Bell, S. A. Snyder, and J. E. DiDonato. 2010. Novel scavenger removal trials increase estimates of wind turbine-caused avian fatality rates. Journal of Wildlife Management 74: 1089-1097 + Online Supplemental Material.

Smallwood, K. S., L. Rugge, and M. L. Morrison. 2009. Influence of behavior on bird mortality in wind energy developments: the Altamont Pass Wind Resource Area, California. Journal of Wildlife Management 73:1082-1098.

Smallwood, K. S. and B. Karas. 2009. Avian and Bat Fatality Rates at Old-Generation and Repowered Wind Turbines in California. Journal of Wildlife Management 73:1062-1071.

Smallwood, K. S., L. Neher, D. Bell, J. DiDonato, B. Karas, S. Snyder, and S. Lopez. 2009. Range management practices to reduce wind turbine impacts on burrowing owls and other raptors in the Altamont Pass Wind Resource Area, California. Final Report to the California Energy Commission, Public Interest Energy Research – Environmental Area, Contract No. CEC-500-2008-080. Sacramento, California. http://www.energy.ca.gov/ 2008publications/CEC-500-2008-080/CEC-500-2008-080.pdf

Smallwood, K. S. 2008. Wind power company compliance with mitigation plans in the Altamont Pass Wind Resource Area. Environmental & Energy Law Policy Journal 2(2):229-285.

Smallwood, K. S., C. G. Thelander. 2008. Bird mortality in the Altamont Pass Wind Resource Area, California. Journal of Wildlife Management 72:215-223.

Smallwood, K. S. 2007. Estimating wind turbine-caused bird mortality. Journal of Wildlife Management 71:2781-2791.

Smallwood, K. S., C. G. Thelander, M. L. Morrison, and L. M. Rugge. 2007. Burrowing owl mortality in the Altamont Pass Wind Resource Area. Journal of Wildlife Management 71:1513-1524.

Smallwood, K. S. and C. Thelander. 2005. Bird mortality in the Altamont Pass Wind Resource Area, March 1998 – September 2001 final report. National Renewable Energy Laboratory, NREL/SR-500-36973. Golden, Colorado.

Smallwood, K. S. and C. Thelander. 2004. Developing methods to reduce bird mortality in the Altamont Pass Wind Resource Area. Final Report to the California Energy Commission, Public Interest Energy Research – Environmental Area, Contract No. 500-01-019. Sacramento, California. http://www.energy.ca.gov/reports/500-04-052/2004-08-09_500-04-052.PDF

U.S. Fish and Wildlife Service. 2014. Final Environmental Assessment for the Shiloh IV Wind Project Eagle Conservation Plan. FWS Division of Migratory Bird Management, Sacramento, CA.

U.S. Fish and Wildlife Service. 2012. Land-Based Wind Energy Guidelines, OMB Control No, 1018-0148.

Weins, D., P. S. Kolar, W. G. Hunt, T. Hunt, M.R. Fuller, and D. A. Bell. 2018. Spatial patterns in occupancy and reproduction of golden eagles during drought: prospects for conservation in changing environments. Ornithological Applications, Vol. 120, pp. 106-124.

Weins, D., *et al*. 2017. Spatial demographic models to inform conservation planning of golden eagles in renewable energy landscapes. Journal of Raptor Research 51(3):234–257.

Weins, D., P. S. Kolar, M. P. Fuller, W. G. Hunt, and T. Hunt. 2014. Estimation of occupancy, breeding success, and abundance of golden eagles (Aquila chrysaetos) in the Diablo Range, California. United States Geological Survey Open File Report 2015-1039.

List of Wind Turbine Micro-Siting Reports for Repowering Projects at Altamont Pass

Smallwood, K. S., and L. Neher. 2018. Comparison of wind turbine collision hazard model performance prepared for repowering projects in the Altamont Pass Wind Resources Area. Report to NextEra Energy Resources, California Attorney General, Audubon Society, East Bay Regional Park District.

Smallwood, K. S. 2018. Addendum to comparison of wind turbine collision hazard model performance: one-year post-construction assessment of golden eagle fatalities at Golden Hills. Report to NextEra Energy Resources, California Attorney General and Audubon Society.

Smallwood, K. S., and L. Neher. 2018. Siting wind turbines to minimize raptor collisions at Rooney Ranch and Sand Hill Repowering Project, Altamont Pass Wind Resource Area. Report to S-Power, Salt Lake City, Utah.

Smallwood, K. S., L. Neher, and D. A. Bell. 2017. Siting to minimize raptor collisions: an example from the repowering Altamont Pass Wind Resource Area. M. Perrow, Ed., Wildlife and Wind Farms - Conflicts and Solutions, Volume 2. Pelagic Publishing, Exeter, United Kingdom.

Smallwood, K. S., and L. Neher. 2017. Comparing bird and bat use data for siting new wind power generation. Report CEC-500-2017-019, California Energy Commission Public Interest Energy Research Program, Sacramento, California.

Smallwood, K. S., and L. Neher. 2016. Siting wind turbines to minimize raptor collisions at Summit Winds Repowering Project, Altamont Pass Wind Resource Area. Report to Salka, Inc., Washington, D.C.

Smallwood, K. S., and L. Neher. 2016. Siting wind turbines to minimize raptor collisions at Sand Hill Repowering Project, Altamont Pass Wind Resource Area. Report to Ogin, Inc., Waltham, Massachusetts.

Smallwood, K. S and L. Neher. 2016. Siting wind turbines to minimize raptor collisions at repowering projects, Altamont Pass Wind Resource Area, Part II of report of Altamont Pass research as Vasco Winds mitigation. Report to NextEra Energy Resources, California Attorney General, Audubon Society, East Bay Regional Park District.

Smallwood, K. S., and L. Neher. 2015a. Siting wind turbines to minimize raptor collisions at Golden Hills Repowering Project, Altamont Pass Wind Resource Area. Report to NextEra Energy Resources, Livermore, California.

Smallwood, K. S., and L. Neher. 2015b. Siting wind turbines to minimize raptor collisions at Golden Hills North Repowering Project, Altamont Pass Wind Resource Area. Report to NextEra Energy Resources, Livermore, California.

Smallwood, K. S., and L. Neher. 2015c. Siting wind turbines to minimize raptor collisions at the Patterson Pass Repowering Project, Altamont Pass Wind Resource Area. Report to EDF Renewable Energy, Oakland, California.

Smallwood, K. S., and L. Neher. 2014. Early assessment of wind turbine layout in Summit Wind Project. Report to Altamont Winds LLC, Tracy, California.

Smallwood, K. S. and L. Neher. 2011. Siting repowered wind turbines to minimize raptor collisions at Tres Vaqueros, Contra Costa County, California. Report to Pattern Energy.

Smallwood, K. S. and L. Neher. 2010. Siting repowered wind turbines to minimize raptor collisions at the Tres Vaqueros Wind Project, Contra Costa County, California. Report to the East Bay Regional Park District, Oakland, California.

Smallwood, K. S. and L. Neher. 2010. Siting repowered wind turbines to minimize raptor collisions at Vasco Winds. Report to NextEra Energy Resources, Livermore, California.

Smallwood, K. S., and L. Neher. 2009. Map-based repowering of the Altamont Pass Wind Resource Area based on burrowing owl burrows, raptor flights, and collisions with wind turbines. Final Report to the California Energy Commission, Public Interest Energy Research – Environmental Area, Contract No. CEC-500-2009-065. Sacramento, California. http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2009-065

Smallwood, K. S., L. Neher, and D. A. Bell. 2009. Map-based repowering and reorganization of a wind resource area to minimize burrowing owl and other bird fatalities. Energies 2009(2):915-943. http://www.mdpi.com/1996-1073/2/4/915

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January 25, 2019

Andrew Young
County of Alameda
224 W. Winton Ave, Suite 110
Hayward, CA 94544

RE: SCH# 2010082063 Altamont Pass Wind Resource Area Repowering; Golden Hills Project; Pass Project, Alameda County

Dear Mr. Young:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements**. If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:
   a. A brief description of the project.
   b. The lead agency contact information.
   c. Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).
   d. A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).
   a. For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:
   a. Alternatives to the project.
   b. Recommended mitigation measures.
   c. Significant effects. (Pub. Resources Code §21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:
   a. Type of environmental review necessary.
   b. Significance of the tribal cultural resources.
   c. Significance of the project's impacts on tribal cultural resources.
   d. If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:
   a. Whether the proposed project has a significant impact on an identified tribal cultural resource.
   b. Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:
   a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or
   b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:
    a. Avoidance and preservation of the resources in place, including, but not limited to:
       i. Planning and construction to avoid the resources and protect the cultural and natural context.
       ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.
    b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
       i. Protecting the cultural character and integrity of the resource.
       ii. Protecting the traditional use of the resource.
       iii. Protecting the confidentiality of the resource.
    c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.
    d. Protecting the resource. (Pub. Resource Code §21084.3 (b)).
    e. Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).
    f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:
    a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.
    b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.
    c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
   a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
   b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
   a. If part or all of the APE has been previously surveyed for cultural resources.
   b. If any known cultural resources have already been recorded on or adjacent to the APE.
   c. If the probability is low, moderate, or high that cultural resources are located in the APE.
   d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
   a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
   b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:
   a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.
   b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.
   a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.
   b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.
   c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Gayle.Totton@nahc.ca.gov.

Sincerely,

for Nancy Gonzalez

Gayle Totton
Associate Governmental Program Analyst

cc: State Clearinghouse

East Bay Regional Park District 85TH 1934 to 2019
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February 6, 2019

Andrew Young
Alameda County Planning Department/Community Development Agency
Community Development Agency
224 West Winton Ave. Rm. 111
Hayward, CA 94544-1215

RE: Notice of Preparation of Subsequent Environmental Impact Report (SEIR) for the Sand Hill Wind Repowering Project, County Planning Application PLN2017-00201.

Dear Mr. Young:

The East Bay Regional Park District ('District') appreciates the opportunity to comment on the Subsequent Environmental Impact Report (SEIR) for the Sand Hill Wind Repowering Project (Project), tiered under the Altamont Pass Wind Resource Area Repowering Final Program Environmental Impact Report (PEIR, State Clearing House #2010082063), certified November 12, 2014, County Planning Application PLN2017-00201.

The Project proposes replacement of 671 existing or previously existing older generation wind turbine sites with up to 40 new generation turbines (Repowering) with rated capacities of between 2.3 and 3.8 megawatts (MW), potentially up to 4.0 MW, and an overall maximum production capacity of up to 144.5 MW. The Project will be located on 15 parcels of privately-owned land encompassing nearly 2,600 acres within Alameda County within and near the northeastern portion of the APWRA. The proposed project is located in the eastern Altamont Pass area of Alameda County in the vicinity of several of the Park District's parks, including Byron Vernal Pools, Vasco Caves Regional Preserve, and Brushy Peak Regional Preserve.

The District supports repowering of old-generation turbines in the Altamont Pass Wind Resource Area (APWRA). The scope of the SEIR should include site-specific effects of the expanded Project and any identified additional Project alternatives, as well as adequate and effective mitigation measures to offset the anticipated impacts of the expanded Project and alternatives, on avian and bat resources, cultural resources, and view sheds as they relate to Byron Vernal Pools, Vasco Caves Regional Preserve, Brushy Peak Regional Preserve, and surrounding open space lands. Relevant Alameda County General Plan policies to consider include Policy 105 which states "The County shall preserve the following major visually-sensitive ridgelines largely in open space use...[including] the ridgelines above Collier Canyon and Vasco Road and the ridgelines surrounding Brushy Peak north of Livermore…" and Policy 113 which states "The County shall review development proposed adjacent to or near public parklands to ensure that views from parks and trails are maintained."

The District has over a decade of experience in working with wind turbine operators to balance the need for wind energy with the protection of natural, cultural, and visual resources in the Altamont region. District Staff serve on the Technical Advisory Committee for wind energy development for the Contra Costa County Conservation and Development Agency, and have an extensive record of conducting research with collaborators aimed at reducing the impacts of wind energy generation on volant animals (birds and bats), including but not limited to changing grazing practices to redistribute raptor prey species (ground squirrels), conducting avian and bat flight behavior observations and satellite tracking of golden eagles to inform collision hazard maps (risk maps) that inform micro-siting of wind turbines, and numerous carcass searcher and scavenger removal studies to better estimate avian and bat fatality rates in wind farms. Risk maps have been produced for the four focal species of raptors (golden eagle, red-tailed hawk, American Kestrel and burrowing owl) that were identified as the standard by which to achieve a 50% reduction in their respective fatality rates through implementation of various mitigation measures, (2007 Settlement Agreement between Audubon, Californians for Renewable Energy (CARE) and several wind energy companies).

The District has a long-standing record of monitoring populations of raptors, especially golden eagle, burrowing owl and prairie falcon, species whose local populations are at risk due to the additive mortality rates caused by wind energy generation in the APWRA.

The District agrees with the findings of the Attorney General (Letter from Attorney General to County of Alameda regarding Sand Hill, LLC, Conditional Use Permit Application, PLN2017-00201; October 22, 1018) outlining the reasons why the project "will have additional or more severe environmental effects on birds and bats…than were analyzed in the County's 2014 program environmental impact report for repowering at Altamont (PEIR)" and thus, "...the County is required to prepare a project-specific subsequent environmental impact report (SEIR) that analyzes the site-specific effects of the Sand Hill Project in detail and includes additional alternatives and mitigation measures for this project." The District's comments below pertain to review of the Sand Hill Wind Repowering Project Environmental Analysis (EA; Alameda County Community Development Department. 2018), The Biological Resources Evaluation (BRA) for the Sand Hill Wind Repowering Project (ICF 2018), and the PEIR (PEIR 2014). Our aim is to improve the assessment of the Project's significant effects on wildlife and to contribute to developing effective mitigating measures in the SEIR.

1. In general, assessment of impacts of the Project on wildlife and habitats needs to take into consideration the expanded scope of the Project - approximately 2,600 acres of rangeland and grassland habitats, including areas that heretofore have never had wind turbines, e.g. the area NE of the Bethany Reservoirs, and a maximum proposed nameplate capacity of 144.5 MW. Estimated impacts as presented in the PEIR and reiterated in the EA require reanalysis to incorporate more recent information on wind energy impacts and local wildlife populations. The County should assess the cumulative effects of this Project and additional permitted and planned repowering projects in the APRWA, especially since the overall 450 MW rated capacity of the APWRA may be exceeded when repowering is completed. An updated PEIR would be advisable.

2. The current EA does not specify amounts of estimated permanent and temporary impacts to land cover types. Measurement of impacts related to temporary and permanent loss of habitat for special status species and habitat types (EA Impacts BIO-3 to BIO-7, BIO-8b, BIO-9, BIO-10,

BIO-13, BIO-15 to BIO18) and their respective mitigation measures related to "compensation for loss of habitat" (EA Mitigation Measures BIO-5c, BIO-5b, BIO-7b, BIO-9, BIO-10b, BIO-15 to BIO-18) need to be expressed in acres of temporary and permanent habitat affected or lost for each species and habitat type so that these losses in the Program Area can be effectively mitigated.

3. Given the expanded scope of the Project beyond the area considered under the PEIR, the County needs to reanalyze the impacted land cover types presented in Table 3.4-7 (p. 3.4-49) of the PEIR and take into account the cumulative impacts due to the Project and the additional wind energy projects already permitted or proposed.

4. Impact BIO-8. Potential construction-related disturbance or mortality of special-status and non-special status migratory birds. The EA states that "Because of the scarcity of trees in the Project Area, particularly near proposed turbine sites and roadways, there is limited potential for construction activities to affect nesting eagles or tree-nest species (e.g. Swainson's hawk, golden eagles, kites)". In fact, recent survey work has documented nesting of Swainson's hawk and golden eagle in isolated trees in the APWRA (EBRPD unpublished data, Kolar and Wiens 2017). In addition, the United States Geological Survey (USGS) has documented golden eagle nests on transmission towers within the project footprint (Kolar, unpublished data), and cliff nesting golden eagles have been documented within the APWRA as recently as 2018 (Kolar, pers. Comm.) The PEIR requires surveys for golden eagle nests within 2 miles of the project site for developing site-specific risk analyses in consultation with the US Fish and Wildlife Service (Service). For new wind projects, the Service requires eagle nesting surveys within 10 miles of the project site. Nesting surveys for eagles and other sensitive species need to be conducted so that appropriate avoidance measures can be implemented and project-related mortality risk to nesting pairs can be evaluated.

5. Impact BIO-9: Permanent and temporary loss of occupied habitat for western burrowing owl and foraging habitat for tri-colored blackbirds and other special status and non-special status species. The EA states that "…the PEIR elected not to propose compensatory mitigation for loss of Swainson's hawk foraging habitat, because that species rarely uses grassland in the program area". In fact, Swainson's hawks do nest and forage in the program area (see Item 4), as do several other species that rely on the grassland habitats of the program area, including the four focal species of raptors – golden eagles, red-tailed hawk, American kestrel – and others such as Northern harrier and prairie falcon. The SEIR should address compensation for loss of foraging habitat in grasslands for these species. For Northern burrowing owl, APWRA-wide risk maps, based on probability of burrow occurrences in relation to digital elevation maps, are available (e.g. Smallwood and Neher 2009, Smallwood et al. 2009). Satellite tracking of golden eagles reveal forage extensively within the Project footprint (see Fig. 1, below).

6. Impact BIO-11: Avian mortality resulting from interaction with wind energy facilities. Repowering the APRWA will continue to cause significant and unavoidable impacts related to avian mortality (PEIR 2014). To establish a baseline to estimate the extent by which repowering may reduce avian and mortality rates relative to the pre-repowered condition, the PEIR provided estimates of avian mortality for non-repowered wind turbines using the Alameda

County Avian Fatality Monitoring Program from 2013 (ICF International 2014a), and for repowered wind turbines using data from the first year (2013) of monitoring at Vasco Winds (Tables 3.4-10 and 3.4-12; PEIR 2014). The County should estimate new baseline mortality rates using the best available science, incorporating the final version of the Alameda County Avian Fatality Monitoring Program (ICF International 2014b) and data from completed monitoring of additional repowered projects, e.g. Vasco Winds (Brown et al. 2016) and improved mortality estimate studies (Smallwood et al. 2018). The first two years of monitoring of the repowered Golden Hills Project (H.T. Harvey & Associates (2017, 2018) indicates that mortality rates for the focal species golden eagle and red-tailed hawk, among others, are substantially higher than estimated from the PEIR (2014). For golden eagle, total fatalities from years 1 and 2 at Golden Hills are 11 and 15, respectively (Table ES-2, H.T. Harvey & Associates (2018). The PEIR (2014) estimated average annual fatalities for a fully repowered 417 MW APWRA (Alternative 1) at 4-17 golden eagles (Table 3.4-10), and for a 450 MW APWRA (Alternative 2) at 5-18 golden eagles (Table 3.4-12). Thus, the Golden Hills project alone may potentially exceed the PEIR (2014) threshold for impacts to golden eagles from the projected repowering of the entire APWRA. Including the cumulative effects from the existing repowered projects (Diablo Winds, Buena Vista, Vasco Winds) definitely pushes the golden eagle fatality rate above the threshold set by the PEIR (2014). In effect, the significant and unavoidable effect of the Project, and permitted projects yet to be built, may be far worse than previously assumed. Cumulative impacts from further repowering of the APWRA, combined with existing impacts, may likely bring blade strike mortality rates for golden eagle back into the pre-repowered range of 55-65 annual fatalities. Hunt et al. (2017) have estimated that the entire reproductive output of 216-255 breeding pairs of golden eagles would be required to sustain a population in the face of such a mortality rate. Wiens et al. (2014, 2018) detected a total of 199 pairs and estimated a total population of approximately 280 pairs for the northern Diablo Range. In other words, the entire annual reproductive output of golden eagles in the northern Diablo Range may be required to compensate for the loss of eagles in the APWRA. Furthermore, eagle productivity in the northern Diablo Range is severely depressed during drought (Wiens et al. 2018). In effect, a fully epowered APWRA may continue to represent a population sink to golden eagles in the northern Diablo Range unless significant mitigation measures are undertaken (Bell and Smallwood 2010, Wiens et al. 2018). Golden eagles represent just one example of avian mortality in the APWRA that requires new analysis and the development of new mitigation options.

Existing Mitigation Measures as outlined in the PEIR (2014) and presented in the EA need to be specified and critically assessed in the SEIR:

BIO11-a: Prepare a project-specific avian protection (APP). This needs to incorporate best available science and must be supported with adequate, long term funding for the life of the project.

BIO-11b: Site turbines to minimize potential mortality of birds. Need to develop risk maps for the entire project site and incorporate latest analyses of wind turbine collision hazard model performance (Smallwood 2018, Smallwood and Neher 2017, 2018; Smallwood et al. 2017). Process of turbine siting needs to be transparent and testable for post-construction efficacy.

BIO-11c: Use turbine designs that reduce avian impacts. This mitigation measure is irrelevant, as standard rotor/tower design has already been selected.

BIO-11d: Incorporate avian-safe practices into design of turbine-related infrastructure. Retrofitting power poles is standard Service requirement.

BIO-11e: Retrofit existing infrastructure to minimize risk to raptors. Nearly irrelevant, as all existing infrastructure has been or will be removed through wind farm decommissioning.

BIO-11g: Implement postconstruction avian fatality monitoring. Incorporate best available science, e.g. Smallwood et al. (2018) and use of scent detection dogs (H.T. Harvey & Associates 2017, 2018; Smallwood et al. *in prep*).

BIO-11h: compensate for loss of raptors and the avian species, including golden eagles, by contributing to conservation efforts. Specify conservation efforts - including research and conservation of habitat. Compensatory mitigation should be applied broadly and at the landscape level. In the case of golden eagles, take thresholds should be set at the local level commensurate with the sustainability of the local eagle population, and it should include cumulative effects, including the loss of reproductive potential of an eagle based on its age class. Compensatory mitigation should be expanded beyond the Service-required retrofitting of power poles to include habitat restoration and enhancement of prey populations that would directly benefit golden eagles. For example, the ground squirrel in California is a major prey item for golden eagles; it is also a keystone species for grasslands. Some landowners adjacent to the APWRA control this species via poisoning which often results in secondary poisoning of eagles and other predators. Mitigation could involve compensating ranchers for economic loss due to ground squirrels if they cease poisoning. Related to this, compensatory mitigation could support programs that create golden eagle conservation easements or pay for conservation bank credits on private lands that would then be a managed for golden eagles (and other species). In many cases this would not alter overall range management goals, but would ensure that the habitat is maintained for the species and its prey populations. Compensatory mitigation could be used to reduce other known threats, such as payments for retiring wind rights or wind farms in areas where eagle mortality rates are unsustainable. Outright land acquisition or purchase of key parcels that may sustain a local eagle population (e.g. parcels with nests) could also be part of a mitigation strategy.

BIO-11i: Implement an avian adaptive management program. Such a program should include the options of seasonal shutdowns and turbine removal or relocations. H.T. Harvey & Associates (2018) have identified potential fatality hotspots at specific turbine locations. Removal of turbines identified as such through post-construction monitoring may be the *best and only* option available to substantially reduce impacts to golden eagles.

BIO-11f: Discourage prey for raptors. In some instances, changing local range management may help reduce raptor foraging nea turbine strings (Smallwood et al. 2009).

Impact BIO-14: Turbine-related fatalities of special-status and other bats. Wind turbine related bat fatalities represent a challenging and heretofore underestimated impact. Results from years

1 and 2 of Golden Hills monitoring using scent-detection dogs estimated annual bat mortalities of 549 (425-663) and 500 (326-674) individuals, respectively (H.T. Harvey & Associates 2017, 2018). These annual mortality rates are far greater than previously reported for the APWRA, and they bely a trend noted in the Vasco Winds study (Brown et al. 2016), namely, that bat fatalities increase with larger repowered wind turbines relative to the old generation turbines. Smallwood has noted bats being attracted to operating turbine nacelles and foraging in their immediate vicinity (Smallwood et al. *in prep*).

Implementation of mitigation measures listed under BIO-14 should follow similarly to those listed above for BIO-11. In addition, for:

BIO-14e: Compensate for expenses incurred by rehabilitation of injured bats (and birds). To arrive at a realistic cost estimate, wildlife hospitals in the region, e.g. Lindsay Wildlife Hospital (Walnut Creek) and Sulpher Creek Nature Center (Hayward), should be queried to obtain cost estimates for treating injured wildlife, in addition to the costs incurred for rehabbing a raptor at the Davis Raptor Center for release. This being said, only in rare cases are raptors injured by wind projects releasable.

Bio-21: Conflict with provisions of an adopted HCP/NCCP or other approved local, regional or state habitat conservation plan. The East Contra Costa Habitat Conservation Plan includes a northern portion of the APWRA which conflicts directly with the APWRA.

Thank you for this opportunity to comment on the Notice of Preparation of Subsequent Environmental Impact Report (SEIR) for the Sand Hill Wind Repowering Project, County Planning Application PLN2017-00201.

Sincerely yours,

signed for

Douglas A. Bell, Ph.D.
Wildlife Program Manager

dbell@ebparks.org

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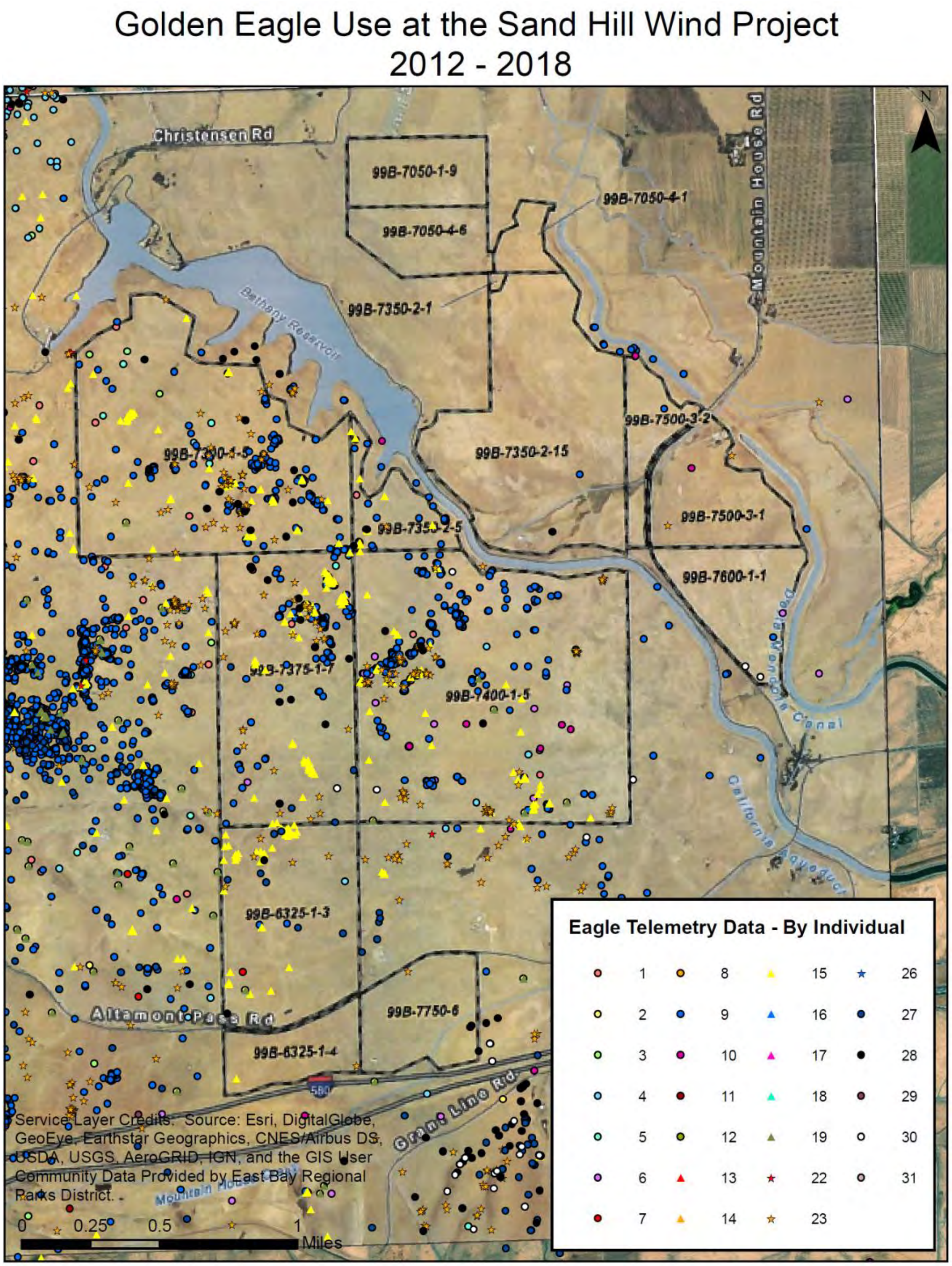
Figure 1. Locations points of 31 golden eagles tracked via satellite transmitters superimposed on the Project footprint. EBRPD unpublished data.



February 12, 2019

Mr. Andrew Young
Project Planner
County of Alameda Planning Department, Community Development Agency
244 W. Winton Avenue, Room 111
Hayward, CA 94544
andrew.young@acgov.org

Dear Mr. Young:

Subject: Sand Hill Wind Repowering Project, Notice of Preparation of a Subsequent Environmental Impact Report tiered under the Altamont Pass Wind Resource Area Repowering Final Program Environmental Impact Report, SCH #2010082063, Alameda County

The California Department of Fish and Wildlife (CDFW) has reviewed the Notice of Preparation (NOP) for a Subsequent Environmental Impact Report (SEIR), tiered under the Altamont Pass Wind Resource Area Repowering Final Program Environmental Impact Report (PEIR), certified November 12, 2014, for the Sand Hill Wind Repowering Project (Project). The Project is an application for a Conditional Use Permit (CUP) to repower (i.e., replace) an estimated 671 existing or previously existing wind energy turbine sites with up to 40 new turbines. The Project is proposed on 15 nearly contiguous parcels extending over approximately 2,600 acres within the northeasterly quadrant of the Alameda County portion of the Altamont Pass Wind Resource Area (APWRA) in northern California. The purpose of the SEIR will be to evaluate the specific environmental effects of the Project as proposed by Sand Hill Wind, LLC (Sand Hill), a subsidiary of sPower (aka Sustainable Power Group).

CDFW provided comments, dated October 25, 2018, on the Notice of Public Hearing and Staff Report from the Alameda County Planning Department (County) as the Lead Agency for the Sand Hill CUP application (Application No. PLN2017-00201) and the 2018 Sand Hill Wind Repowering Project Environmental Analysis (EA).

CDFW is providing comments and recommendations on the SEIR regarding those activities involved in the Project that are within CDFW's area of expertise and relevant to its statutory responsibilities (Fish and Game Code, § 1802), and/or which are required to be approved by CDFW (CEQA Guidelines, §§ 15086, 15096 and 15204). CDFW received an extension from the County to submit comments on the NOP to February 13, 2019.

CDFW ROLE

CDFW is a Trustee Agency with responsibility under the California Environmental Quality Act (CEQA; Pub. Resources Code, § 21000 et seq.) pursuant to CEQA Guidelines section 15386 for commenting on projects that could impact fish, plant, and wildlife resources. CDFW is also considered a Responsible Agency if a project would require discretionary approval, such as a California Endangered Species Act (CESA) permit, a Lake or Streambed Alteration (LSA) Agreement, or other provisions of the Fish and Game Code that afford protection to the state's fish and wildlife trust resources.

REGULATORY REQUIREMENTS

California Endangered Species Act
Please be advised that a CESA permit must be obtained if the Project has the potential to result in "take" of plants or animals listed under CESA, either during construction or over the life of the Project. Issuance of a CESA permit is subject to CEQA documentation; the CEQA document must specify impacts, mitigation measures, and a mitigation monitoring and reporting program. If the Project will impact CESA listed species, early consultation is encouraged, as significant modification to the Project and mitigation measures may be required in order to obtain a CESA Permit.

CEQA requires a Mandatory Finding of Significance if a project is likely to substantially restrict the range or reduce the population of a threatened or endangered species. (Pub. Resources Code, §§ 21001, subd. (c), 21083; CEQA Guidelines, §§ 15380, 15064, and 15065). Impacts must be avoided or mitigated to less-than-significant levels unless the CEQA Lead Agency makes and supports Findings of Overriding Consideration (FOC). The CEQA Lead Agency's FOC does not eliminate the Project proponent's obligation to comply with Fish and Game Code section 2080.

Lake and Streambed Alteration
CDFW requires an LSA Notification, pursuant to Fish and Game Code section1600 et. seq., for Project activities affecting lakes or streams and associated riparian habitat. Notification is required for any activity that may substantially divert or obstruct the natural flow; change or use material from the bed, channel, or bank including associated riparian or wetland resources; or deposit or dispose of material where it may pass into a river, lake or stream. Work within ephemeral streams, washes, watercourses with a subsurface flow, and floodplains are subject to notification requirements. CDFW will consider the CEQA document for the Project and may issue an LSA Agreement. CDFW may not execute the final LSA Agreement (or Incidental Take Permit) until it has complied with CEQA as a Responsible Agency.

PROJECT DESCRIPTION SUMMARY

Proponent: Sand Hill Wind, LLC

Description and Location: The Project is located at 12040 Altamont Pass Road (address for one of 15 nearly contiguous parcels) extending over approximately 2,600 acres in the eastern Altamont Pass area of Alameda County. The Project is located north and south of Altamont Pass Road between two-thirds and two miles west of Grant Line Road, east and west of Mountain House Road between one-quarter and two miles north of Grant Line Road, west of the Delta-Mendota Canal one-mile northwest of Mountain House Road, west of Bethany Reservoir and southeast of the intersection of Christensen and Bruns Roads. The Project will allow repowering of an estimated 671 existing or previously existing wind energy turbine sites with up to 40 new turbines with a maximum production capacity of 144.5 megawatts (MW), using turbines rated between 2.3 and 3.8 MW (potentially up to 4.0 MW) per turbine.

Environmental Setting
The NOP states the Project will decommission a total of 671 old generation wind turbines or former turbine sites and replace them with up to 40 new wind turbines. However, CDFW is aware that most, if not all, of the existing turbines have been decommissioned.

The Project description should include a complete and detailed description of current site conditions, including a description all additional work, such as removal of concrete foundations, that will be required as part of the Project. The Project description should detail activities that result in any type of ground disturbance, including "minor" disturbances (e.g., trampling, soil erosion, runoff, and sedimentation). For example, the Project description should include information on work areas, temporary and permanent access roads, equipment staging and storage areas, sources of water withdrawal (for dust control), stockpile storage, post-project destination of runoff from the Project site, changes in topography as a result of grading, and potential spills and leaks.

The SEIR should also discuss the status of wind projects that have already been approved and are operating on both the Alameda and Contra Costa County sides of the APWRA, and the total amount of ongoing annual avian and bat deaths that are currently known or estimated to be occurring in the entire APWRA based on past monitoring results and other available information.

Impact Analysis
CDFW believes that there is substantial evidence indicating that the Project will have additional or more severe environmental effects on birds and bats, and other adverse effects on biological resources, than were previously analyzed in the November 2014 PEIR. There also is substantial evidence that the Project will require additional or different alternatives or mitigation measures than were specifically analyzed and included in the PEIR.

CDFW recommends that a more appropriate and detailed analysis, to the extent scientifically possible in light of the best available current information, of all potential impacts of the Project be conducted for the proposed Project.

The Project has changed significantly since the County approved the previous version of the Sand Hill Project in 2016. The previously approved project was to replace 433 existing wind turbines or former turbine sites with up to 12 new 2.5 to 3.0 MW turbines, for up to 36 MW of total generating capacity. The current Project is over three times as large as the previously approved project and will cover about three times the area. The current Project will utilize 40 turbines up to 4 MW in size for a total of up to 144.5 MW; however, the PEIR only analyzed turbines up to 3 MW in size.

CDFW recommends that the County ensure that the SEIR include the following:

1) A complete evaluation of all new information since the PEIR, including all information identified in comment letters, avian and bat fatality monitoring reports for existing wind energy projects located within the APWRA, such as Golden Hills and Vasco Winds, and all

new relevant scientific studies on the impacts of, and mitigation measures for, repowered turbines within the APWRA that have been published since the PEIR was certified. The SEIR should include a comprehensive update to PEIR impact analyses for avian and bat fatalities in light of this new information and the application to this specific Project.

2) Identification of the precise amount and extent of grading for turbine pads and roads, and details regarding changes in topography expected as a result of access road construction and turbine pads and the potential changes in overland flow and drainage. In addition, the SEIR should analyze the effects of this grading, particularly as to its implications for turbine micro-siting and impacts of turbine operation on birds and bats (see below).

3) A detailed micro-siting report, including analyses of latest micro-siting science and field studies on topography for this Project (as modified by grading) as well as bird and bat behavior and use in the Project area. The most dangerous anticipated turbine locations for birds and bats should be identified and those locations should be avoided. This micro siting analysis must be done in the SEIR itself and should not be delayed to a later date as with prior projects under the PEIR. The micro-siting analysis should be provided for public review and comment in the SEIR.

4) A Project-specific impact analysis on tri-colored blackbird (*Agelaius tricolor*), a species listed under CESA as threatened. The SEIR must include a detailed habitat assessment for this species and a thorough analysis of potential impacts of the Project on nesting, foraging and roosting habitat on the Project site during construction as well impacts to the species from ongoing turbine operations. The *Golden Hills Wind Energy Project Post-construction Bird and Bat Fatality Monitoring 2017 Summary Report* (SC-004607), prepared by H.T. Harvey & Associates, dated January 31, 2018, documents that the operation of the Golden Hills project resulted in tri-colored blackbird mortalities in 2017. In addition, the EA for the Sand Hill Project noted that shrub and ground nesting species, such as tri-colored blackbird, could be affected by construction activities.

5) An analysis of the effects of larger turbines between 3-4 MW in size on rotor swept area and corresponding impacts on birds and bats.

6) An analysis of the effects of operation of turbines and effects of nighttime lighting on bats based on best available scientific information and past wind energy project monitoring reports.

Alternatives:
CDFW strongly recommends that the SEIR give serious consideration to a wide range of alternatives that will reduce avian and bat fatalities resulting from the proposed Project, including serious consideration of the no-project alternative, reduction in Project size (number and size of turbines), various turbine micro-siting arrays to avoid and minimize impacts to the four focal raptor species described in the PEIR, namely golden eagle (*Aquila chrysaetos*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*) and burrowing owl (*Athene cunicularia*) and bats, and other alternatives.

Mitigation measures:
The SEIR must analyze a full array of more stringent mitigation measures and update the PEIR mitigation measures in light of all new scientific literature and monitoring information. CDFW provides the following comments and recommendations on appropriate and feasible mitigation for the proposed Project:

1) Identification in the SEIR of more stringent micro-siting requirements (e.g. no turbines in red or orange zones) or reduction of the number of turbines if it is not possible to avoid these zones.

2) An updated compensatory mitigation program from the one that was included in the PEIR to reflect the best available scientific information regarding the nature and extent of unavoidable impacts of repowering projects on birds and bats. Compensatory mitigation should be designed to provide complete, quantified and effective compensation for all anticipated unavoidable impacts of the Project.

3) A substantial increase in compensatory mitigation measures and fees than are currently provided in the PEIR based on the recommended updated impact analysis. The type and amount of compensatory mitigation must specify the preferred measures to be implemented rather than just providing a range of possible future options as currently provided in the PEIR.

4) A more robust adaptive management program for birds and bats than the PEIR in order to require more immediate and significant reductions in identified fatalities at offending turbines or, if necessary, project-wide curtailment of turbines during certain times of the day or year if anticipated to significantly reduce unavoidable effects on focal raptor species and/or bats. More stringent adaptive management measures could include turbine curtailment or shut downs during specific times of the day/night or months of the year when raptors or bats are more likely to be present, real time turbine curtailment using the latest detection technology, implementing changes in turbine cut in speed upon specified triggers, and other effective and legally-enforceable measures after one year of Project monitoring.

5) An updated and improved monitoring program based on the best available scientific information and monitoring for other projects since the PEIR. This should include monitoring for more than three years, monitoring of all turbines on a weekly basis, use of scent detection dogs, etc.

6) The inclusion in the SEIR of an avian protection plan rather than delayed such a plan to a later date as with prior PEIR projects.

FILING FEES

Filling fees for CEQA documents are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW. Payment of the fee is required in order for the underlying project approval to be operative, vested, and final. (Cal. Code Regs., tit. 14, § 753.5; Fish and Game Code, § 711.4; Pub. Resources Code, § 21089).

CONCLUSION

CDFW appreciates the opportunity to comment on the proposed Project to assist the County in identifying and mitigating Project impacts on biological resources.

Questions regarding this letter or further coordination should be directed to Ms. Marcia Grefsrud, Environmental Scientist, at (707) 644-2812 or Marcia.Grefsrud@wildlife.ca.gov; or Ms. Brenda Blinn, Senior Environmental Scientist (Supervisory), at (707) 944-5541.

Sincerely,

Gregg Erickson

Gregg Erickson
Regional Manager
Bay Delta Region

cc: Office of Planning and Research, State Clearinghouse – state.clearinghouse@opr.ca.gov
Ryan Olah, U.S. Fish and Wildlife Service – ryan_olah@fws.gov

REFERENCE

Alameda County Community Development Department. 2018. Sand Hill Wind Repowering Project Environmental Analysis. September. (ICF 00631.17.) Hayward, CA. With technical assistance from ICF, Sacramento, CA.

Appendix B
Air Quality Modeling

Memorandum

To:	Korina Cassidy, Sand Hill Wind, LLC
From:	Laura Yoon, ICF
Cc:	Brad Schafer, ICF
Date:	June 19, 2018
Re:	**Sand Hill Air Quality and Greenhouse Gas Analysis**

Introduction

Air quality and greenhouse gas (GHG) impacts from repowering the Alameda County portion of the Altamont Pass Wind Resource Area (APWRA) were previously assessed in the *Altamont Pass Wind Resource Area Repowering Final Program Environmental Impact Report* (program EIR). The program EIR evaluated impacts associated with development of up to 450 megawatts (MW) in combined nameplate capacity within the program area. Sand Hill Wind, LLC (Sand Hill) is proposing to develop the 144.5 MW Sand Hill project (proposed project), which is in the program area and was included in the development capacity evaluated in the program EIR. This memorandum quantifies criteria pollutant and GHG emissions that would be generated by construction and operation of the proposed project.

Analysis Methods

Consistent with federal, state, and local guidance, the emissions analysis focuses on the following three types of pollutants that are of greatest concern for the proposed project.

- **Criteria pollutants—**Pollutants for which the U.S. Environmental Protection Agency (EPA) and California Air Resources Board (ARB) have set ambient air quality standards or that are chemical precursors to compounds for which ambient standards have been set. The criteria pollutants associated with the proposed project are ozone, particulate matter (PM) (PM10 is PM smaller than or equal to 10 microns in diameter and PM2.5 is PM smaller than or equal to 2.5 microns in diameter), carbon monoxide (CO), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2).

- **Toxic air containments (TACs)—**The TAC of primary concern for construction and operation of the proposed project is diesel particulate matter (DPM). This pollutant is known or suspected to cause cancer and other serious health and environmental effects.
- **GHGs—**GHGs are gaseous compounds that limit the transmission of Earth's radiated heat out to space. GHGs include ozone, water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated gases (e.g., chlorofluorocarbons, hydrofluorocarbons [HFC], and sulfur hexafluoride [SF_6]). The GHGs of concern for construction and operation of the proposed project are CO_2, CH_4, N_2O, and SF_6

Analysts estimated combustion exhaust and fugitive dust based on project-specific construction data (e.g., schedule, equipment, truck volumes) provided by the project engineer and a combination of emission factors and methodologies from CalEEMod, version 2016.3.2; ARB's EMFAC2017 model; EPA's AP-42 Compilation of Air Pollutant Emission Factors, and several other industry-accepted tools. Fugitive reactive organic gas emissions from architectural coating of the 6,000-square-foot operations and maintenance (O&M) building were also estimated using CalEEMod. All major design components of the project (e.g., road construction, turbine delivery) were quantitatively analyzed and included in the emissions modeling to ensure that emissions from construction and air quality impacts associated with the completed project were accurately assessed.

Project construction would take place in the Bay Area Air Quality Management District (BAAQMD). However, some equipment and materials would originate from the Port of Stockton and the city of Tracy, both of which are in the San Joaquin Valley Air Pollution Control District (SJVAPCD). Accordingly, consistent with the program EIR, heavy-duty truck trip exhaust emissions that would be generated in the SJVAPCD have been quantified and included in the construction analysis.

Operational criteria pollutant and GHG emissions were estimated for routine maintenance activities, worker commutes, and vehicle trips. The GHG analysis also considers emissions from minor electricity consumption and SF_6 circuit breaker leakage, as well as emission reductions that would occur from offsetting grid electricity, which includes fossil fuel-based resources, with wind-generated electricity, which is a renewable resource that does not generate any emissions.

Refer to Attachment A for the detailed modeling assumptions.

Analysis Results

Construction-Generated Criteria Pollutant Emissions

Table 1 summarizes estimated unmitigated emissions in SJVAPCD from construction of the proposed project. Emissions are presented in terms of tons per year and average pounds per day for comparison to SJVAPCD's (2015) thresholds. Table 2 summarizes unmitigated emissions in the BAAQMD in terms of pounds per day. The total amount, duration, and intensity of construction activity could have a substantial effect on the amount of construction emissions, their concentrations, and the resulting impacts occurring at any one time. Consequently, the emission forecasts provided in this analysis reflect a specific set of conservative assumptions based on the expected construction scenario wherein a relatively large amount of construction takes place in a relatively intensive and overlapped schedule. Because of this conservative assumption, actual emissions could be less than those forecasted.

Table 1. Unmitigated Criteria Pollutants from Construction of the Sand Hill Project in SJVAPCD

	Average Pounds per Day[a]						Tons per Year					
Activity	ROG	NO_X	CO	SO_2	PM10	PM2.5	ROG	NO_X	CO	SO_2	PM10	PM2.5
Offsite truck trips	1	23	3	<1	4	1	<1	1	<1	<1	<1	<1
SJVAPCD threshold[b]	100	100	100	100	100	100	10	10	100	27	15	15
Significant Impact?	No	No	No	No	No	No	No	No	No	No	No	No

ROG = reactive organic gases.
NO_X = nitrogen oxide.
CO = carbon monoxide.
PM10 = particulate matter that is 10 microns in diameter and smaller.
PM2.5 = particulate matter that is 2.5 microns in diameter and smaller.
SO_2 = sulfur dioxide.

[a] Presents average emissions during a single day of construction in each year, consistent with guidance for correct application of SJVAPCD's ambient air quality analysis screening criteria.

[b] The 100-pound-per-day threshold is a screening-level threshold to help determine whether increased emissions from a project will cause or contribute to a violation of the ambient air quality standards.

Table 2. Unmitigated Criteria Pollutants from Construction of the Sand Hill Project in BAAQMD

					PM10		PM2.5	
Activity	ROG	NO_X	CO	SO_2	Exhaust	Dust	Exhaust	Dust
Laydown, substations and switch yards	4	39	22	<1	1	24	1	12
Road construction	9	***81***	47	<1	3	34	3	23
Turbine foundations	14	***131***	74	<1	5	57	4	35
Turbine delivery and installation	3	38	23	<1	1	7	1	1
Utility collector line installation	2	19	11	<1	1	10	1	6
O&M building construction	19	29	22	<1	2	7	2	6
Restoration and cleanup	4	37	19	<1	1	11	1	16
Offsite truck trips	2	41	9	<1	1	7	1	2
Offsite worker trips	<1	<1	4	<1	<1	3	<1	1
Maximum Daily[a]	50	***341***	188	1	12	142	12	84
BAAQMD (2017) threshold	54	54	-	-	82	BMPs	54	BMPs
Significant Impact?	No	***Yes***	No	No	No	***Yes***	No	***Yes***

ROG = reactive organic gases.
NO_X = nitrogen oxide.
CO = carbon monoxide.
PM10 = particulate matter that is 10 microns in diameter and smaller.
PM2.5 = particulate matter that is 2.5 microns in diameter and smaller.
SO_2 = sulfur dioxide.

[a] Includes all construction activities except *turbine delivery and installation* and *restoration and cleanup*, which would not occur during the period of maximum daily emissions (June 2019).

As shown in Table 1, material hauling activity in SJVAPCD would not exceed any of the air district's thresholds of significance.

As shown in Table 2, NO_x emissions generated by *road construction* and *turbine foundations* would independently exceed BAAQMD's threshold of significance. Maximum daily emissions from concurrent construction overlapping activities would also exceed the threshold. Consistent with BAAQMD guidance, fugitive dust emission would also be potentially significant without implementation of BMPs.

Mitigation Measures AQ-2a and AQ-2b from the program EIR are required to reduce NO_x and fugitive dust emissions from project construction. Table 3 summarizes mitigated emissions in the BAAQMD. As shown in Table 3, Mitigation Measures AQ-2a and AQ-2b would reduce fugitive dust emissions to a less-than-significant level, but NO_X emissions would still exceed BAAQMD's threshold and would therefore be significant and unavoidable.

Table 3. Mitigated Criteria Pollutants from Construction of the Sand Hill Project in BAAQMD

Activity	ROG	NO_X	CO	SO_2	PM10		PM2.5	
					Exhaust	Dust	Exhaust	Dust
Laydown, substations and switch yards	4	33	22	<1	1	12	1	6
Road construction	9	***66***	47	<1	2	17	2	11
Turbine foundations	14	***109***	74	<1	3	30	3	16
Turbine delivery and installation	3	31	23	<1	1	4	1	0
Utility collector line installation	2	15	11	<1	<1	5	<1	3
O&M building construction	19	23	22	<1	1	5	1	3
Restoration and cleanup	4	30	19	<1	1	5	1	7
Offsite truck trips	2	41	9	<1	1	7	1	2
Offsite worker trips	<1	<1	4	<1	<1	3	<1	1
Maximum Daily[a]	50	***288***	188	1	8	80	7	41
BAAQMD (2017) threshold	54	54	-	-	82	BMPs	54	BMPs
Significant Impact?	No	***Yes***	No	No	No	No	No	No

ROG = reactive organic gases.
NO_X = nitrogen oxide.
CO = carbon monoxide.
PM10 = particulate matter that is 10 microns in diameter and smaller.
PM2.5 = particulate matter that is 2.5 microns in diameter and smaller.
SO_2 = sulfur dioxide.
[a] Includes all construction activities except *turbine delivery and installation* and *restoration and cleanup*, which would not occur during the period producing the maximum daily emissions (June 2019.

Operational Criteria Pollutant Emissions

Table 4 presents estimated emissions from O&M of the proposed project. These emissions would occur exclusively in the BAAQMD and would begin following completion of project construction (i.e., the first operational year would be 2020). As shown in Table 4, O&M emissions would not exceed BAAQMD's thresholds of significance.

Table 4. Criteria Pollutants from Operation of the Sand Hill Project in BAAQMD (pounds per day)[a]

Activity	ROG	NO_X	CO	SO_2	PM10	PM2.5
Offsite worker trips	<1	<1	<1	<1	<1	<1
Maintenance/operation	2	21	13	<1	9	6
Total	2	21	14	<1	9	7
BAAQMD (2017) threshold	54	54	-	-	82	54
Significant Impact?	No	No	No	No	No	No

ROG = reactive organic gases.
NO_X = nitrogen oxide.
CO = carbon monoxide.
PM10 = particulate matter that is 10 microns in diameter and smaller.
PM2.5 = particulate matter that is 2.5 microns in diameter and smaller.
SO_2 = sulfur dioxide.

[a] Wind energy generated by the proposed project will displace a comparable quantity of conventional grid energy. Power plants located throughout the state supply the grid with power; some of these generate criteria pollutants. Because these power plants are located throughout the state, criteria pollutant reductions achieved by the proposed project cannot be fully ascribed to the BAAQMD and are therefore not reported in the table.

Greenhouse Gas Emissions

Table 5 summarizes estimated construction and operational GHG emissions associated with the proposed project. GHG emissions are inherently cumulative and do not ascribe to air district boundaries, like most regional and local criteria pollutants. Accordingly, GHG emissions generated in BAAQMD and SJVAPCD during construction are summed together in Table 5. Emission reductions that would occur from offsetting grid electricity with wind-generated electricity are also presented.

Table 5. GHG Emissions from Construction and Operation of the Sand Hill Project in BAAQMD (metric tons)

Source	CO_2	CH_4	N_2O	SF_6	CO_2e
Construction					
Laydown, substations and switch yards	57	<1	<1	0	58
Road construction	185	<1	<1	0	188
Turbine foundations	263	<1	<1	0	269
Turbine delivery and installation	128	<1	<1	0	131
Utility collector line installation	61	<1	<1	0	63
O&M building construction	21	<1	<1	0	21
Restoration and cleanup	88	<1	<1	0	89
Offsite truck trips	743	<1	<1	0	777
Offsite worker trips	93	<1	<1	0	94
Electricity use	1	<1	<1	0	1
Total	1,640	<1	<1	0	1,691
Amortized (per year for 30 years)					56
Operation					
Offsite worker trips	19	<1	<1	0	19

Source	CO_2	CH_4	N_2O	SF_6	CO_2e
Maintenance/operation	46	<1	<1	0	47
Electricity use	1	<1	<1	0	1
Circuit breaker leakage	0	0	0	<1	22
Total	66	<1	<1	<1	89
Total annual construction and operation emissions					145
Annual GHG reductions from offsetting grid electricity					-50,274
Annual net GHG emissions					-50,128

CO_2 = carbon dioxide.
CH_4 = methane.
N_2O = nitrous oxide.
SF_6 = sulfur hexafluoride.
CO_2e = carbon dioxide equivalent.
GHG = greenhouse gas.

As shown in Table 5, wind energy generated by the proposed project would reduce GHG emissions by approximately 50,000 metric tons carbon dioxide equivalent per year. This would more than offset emissions generated by project construction and O&M.

References Cited

Bay Area Air Quality Management District. 2017. *Air Quality Guidelines*. May.

San Joaquin Valley Air Pollution Control District. 2015. *Guidance for Assessing and Mitigating Air Quality Impacts*. March.

Attachment A

Detailed Modeling Assumptions

Table 1. Onsite Construction Equipment

Phase	County	Equipment Name	Number/Day	Hours/day	Fuel Type	HP	Start	End	Working Days
Laydown, substations and switch yards	Alameda	1-ton crew cab 4x4	2	8	Diesel	300	5/1/2019	6/30/2019	37
Laydown, substations and switch yards	Alameda	Road grader	1	8	Diesel	350	5/1/2019	6/30/2019	37
Laydown, substations and switch yards	Alameda	Track type dozer	1	8	Diesel	350	5/1/2019	6/30/2019	37
Laydown, substations and switch yards	Alameda	Drum type compactor	1	8	Diesel	250	5/1/2019	6/30/2019	37
Laydown, substations and switch yards	Alameda	Water truck	1	6	Diesel	350	5/1/2019	6/30/2019	37
Laydown, substations and switch yards	Alameda	Lowboy/truck/trailer	2	8	Diesel	500	5/1/2019	6/30/2019	37
Laydown, substations and switch yards	Alameda	Backhoe/front loader	1	8	Diesel	350	5/1/2019	6/30/2019	37
Road construction	Alameda	1-ton crew cab 4x4	2	8	Diesel	300	5/8/2019	7/31/2019	56
Road construction	Alameda	Road grader	2	8	Diesel	350	5/8/2019	7/31/2019	56
Road construction	Alameda	Track type dozer	2	8	Diesel	350	5/8/2019	7/31/2019	56
Road construction	Alameda	Drum type compactor	2	8	Diesel	250	5/8/2019	7/31/2019	56
Road construction	Alameda	Water truck	2	6	Diesel	350	5/8/2019	7/31/2019	56
Road construction	Alameda	Lowboy/truck/trailer	2	8	Diesel	500	5/8/2019	7/31/2019	56
Road construction	Alameda	Backhoe/front loader	1	8	Diesel	350	5/8/2019	7/31/2019	56
Road construction	Alameda	Excavator	1	8	Diesel	350	5/8/2019	7/31/2019	56
Road construction	Alameda	Rock crusher	1	8	Diesel	350	5/8/2019	7/31/2019	56
Turbine foundations	Alameda	1-ton crew cab 4x4	2	8	Diesel	300	6/3/2019	8/31/2019	49
Turbine foundations	Alameda	Road grader	3	8	Diesel	350	6/3/2019	8/31/2019	49
Turbine foundations	Alameda	Track type dozer	3	8	Diesel	350	6/3/2019	8/31/2019	49
Turbine foundations	Alameda	Drum type compactor	3	8	Diesel	250	6/3/2019	8/31/2019	49
Turbine foundations	Alameda	Water truck	3	6	Diesel	350	6/3/2019	8/31/2019	49
Turbine foundations	Alameda	Lowboy/truck/trailer	3	8	Diesel	500	6/3/2019	8/31/2019	49
Turbine foundations	Alameda	Backhoe/front loader	3	8	Diesel	350	6/3/2019	8/31/2019	49
Turbine foundations	Alameda	Excavator	2	8	Diesel	350	6/3/2019	8/31/2019	49
Turbine foundations	Alameda	Rock crusher	1	8	Diesel	350	6/3/2019	8/31/2019	49
Turbine foundations	Alameda	Cement trucks	3	8	Diesel	335	6/3/2019	8/31/2019	49
Turbine delivery and installation	Alameda	Crane	2	8	Diesel	500	7/1/2019	10/31/2019	88
Turbine delivery and installation	Alameda	Lowboy/truck/trailer	2	8	Diesel	500	7/1/2019	10/31/2019	88
Turbine delivery and installation	Alameda	Excavator	2	8	Diesel	400	7/1/2019	10/31/2019	88
Utility collector line installation	Alameda	1-ton crew cab 4x4	1	8	Diesel	300	6/15/2019	9/15/2019	76
Utility collector line installation	Alameda	Water truck	1	6	Diesel	350	6/15/2019	9/15/2019	76
Utility collector line installation	Alameda	Backhoe/front loader	1	8	Diesel	350	6/15/2019	9/15/2019	76
Utility collector line installation	Alameda	Trencher	1	8	Diesel	350	6/15/2019	9/15/2019	76
Utility collector line installation	Alameda	HDD bore machine	1	8	Diesel	350	6/15/2019	8/1/2019	37
O&M building construction	Alameda	Grader	1	8	Diesel	187	6/1/2019	6/4/2019	2
O&M building construction	Alameda	Tractors/loaders/backhoe	1	8	Diesel	97	6/1/2019	6/4/2019	2
O&M building construction	Alameda	Concrete/industrial saw	1	8	Diesel	81	6/5/2019	6/6/2019	2
O&M building construction	Alameda	Rubber-tired dozer	1	1	Diesel	247	6/5/2019	6/6/2019	2

Phase	County	Equipment Name	Number/Day	Hours/day	Fuel Type	HP	Start	End	Working Days
O&M building construction	Alameda	Tractors/loaders/backhoe	2	6	Diesel	97	6/5/2019	6/6/2019	2
O&M building construction	Alameda	Crane	1	4	Diesel	231	6/7/2019	8/27/2019	58
O&M building construction	Alameda	Forklift	2	6	Diesel	89	6/7/2019	8/27/2019	58
O&M building construction	Alameda	Tractors/loaders/backhoe	2	8	Diesel	97	6/7/2019	8/27/2019	58
O&M building construction	Alameda	Vendor truck	1	8	Diesel	300	6/7/2019	8/27/2019	58
O&M building construction	Alameda	Air compressor	1	6	Diesel	78	8/28/2019	8/31/2019	4
Restoration and cleanup	Alameda	Road grader	3	8	Diesel	350	8/1/2019	11/30/2019	55
Restoration and cleanup	Alameda	Excavator	3	8	Diesel	350	8/1/2019	11/30/2019	55

Table 2. Offsite Construction Vehicles

Phase	County	Vehicle Type	Number/Day	Fuel Type	Miles/Trip	Total Trips	Start	End
WTG machines, pads and substation materials	Alameda	Light duty	3	Gasoline	1	360	5/1/2019	10/31/2019
WTG machines, pads and substation materials	Alameda	Light duty	3	Gasoline	1	360	5/1/2019	10/31/2019
WTG machines, pads and substation materials	Alameda	Light duty	3	Gasoline	23	360	5/1/2019	10/31/2019
WTG machines, pads and substation materials	Alameda	Heavy duty	4	Diesel	5	590	5/1/2019	10/31/2019
WTG machines, pads and substation materials	Alameda	Heavy duty	4	Diesel	1	590	5/1/2019	10/31/2019
WTG machines, pads and substation materials	Alameda	Heavy duty	4	Diesel	29	590	5/1/2019	10/31/2019
WTG machines, pads and substation materials	Alameda	Heavy duty	11	Diesel	6	1,430	5/1/2019	10/31/2019
WTG machines, pads and substation materials	Alameda	Heavy duty	11	Diesel	1	1,430	5/1/2019	10/31/2019
WTG machines, pads and substation materials	Alameda	Heavy duty	11	Diesel	19	1,430	5/1/2019	10/31/2019
Roads, WTG foundations and aggregate	Alameda	Light duty	37	Gasoline	1	3,240	5/1/2019	8/31/2019
Roads, WTG foundations and aggregate	Alameda	Light duty	37	Gasoline	1	3,240	5/1/2019	8/31/2019
Roads, WTG foundations and aggregate	Alameda	Light duty	37	Gasoline	23	3,240	5/1/2019	8/31/2019
Roads, WTG foundations and aggregate	Alameda	Heavy duty	57	Diesel	5	5,000	5/1/2019	8/31/2019
Roads, WTG foundations and aggregate	Alameda	Heavy duty	57	Diesel	1	5,000	5/1/2019	8/31/2019
Roads, WTG foundations and aggregate	Alameda	Heavy duty	57	Diesel	29	5,000	5/1/2019	8/31/2019
Roads, WTG foundations and aggregate	Alameda	Heavy duty	8	Diesel	6	707	5/1/2019	8/31/2019
Roads, WTG foundations and aggregate	Alameda	Heavy duty	8	Diesel	1	707	5/1/2019	8/31/2019
Roads, WTG foundations and aggregate	Alameda	Heavy duty	8	Diesel	19	707	5/1/2019	8/31/2019
WTG machines, pads and substation materials	San Joaquin	Heavy duty	3	Diesel	56	357	5/1/2019	10/31/2019
WTG machines, pads and substation materials	San Joaquin	Heavy duty	2	Diesel	16	233	5/1/2019	10/31/2019
Roads, WTG foundations and aggregate	San Joaquin	Heavy duty	34	Diesel	56	3,028	5/1/2019	8/31/2019
Roads, WTG foundations and aggregate	San Joaquin	Heavy duty	22	Diesel	16	1,972	5/1/2019	8/31/2019
Worker trips	Alameda	Light duty	69	Gasoline	25	10,575	5/1/2019	11/30/2019

Table 3. Construction Site Disturbance

Phase	Total Acres
Laydown, substations and switch yards	35
Road Construction	53
Turbine foundations	110
Utility collector line installation	47
O&M building construction	3
Restoration and cleanup	224

Table 4. Operations and Maintenance

Phase	County	Equipment Name	Number/Day	Hours/day	Fuel Type	HP	Start	End	Working Days	Daily Miles	Total Acres
Maintenance/operation	Alameda	1 ton crew cab 4x4	2	4	Diesel	300	1/1/2020	12/31/2020	262	120	-
Maintenance/operation	Alameda	Road grader	1	8	Diesel	350	1/1/2020	1/7/2020	5	-	1.00
Maintenance/operation	Alameda	Crane	1	8	Diesel	500	1/1/2020	1/7/2020	5	-	-
Maintenance/operation	Alameda	Lowboy/truck/trailer	1	2	Diesel	500	1/1/2020	1/14/2020	10	30	-
Maintenance/operation	Alameda	Generator	2	2	Diesel	100	1/1/2020	12/31/2020	262	-	-
Worker trips	Alameda	Light duty	2	-	Gasoline	-	1/1/2020	12/31/2020	262	213	-

Table 1. Construction Onsite Equipment

Phase	County	Equipment Name	Number/Day	Hours/day	Fuel Type	HP	Start	End	Working Days
Laydown, substations and switch yards	Alameda	1 ton crew cab 4x4	2	8	Diesel	300	5/1/2019	6/30/2019	37
Laydown, substations and switch yards	Alameda	Road grader	1	8	Diesel	350	5/1/2019	6/30/2019	37
Laydown, substations and switch yards	Alameda	Track type dozer	1	8	Diesel	350	5/1/2019	6/30/2019	37
Laydown, substations and switch yards	Alameda	Drum type compactor	1	8	Diesel	250	5/1/2019	6/30/2019	37
Laydown, substations and switch yards	Alameda	Water truck	1	6	Diesel	350	5/1/2019	6/30/2019	37
Laydown, substations and switch yards	Alameda	Lowboy/truck/trailer	2	8	Diesel	500	5/1/2019	6/30/2019	37
Laydown, substations and switch yards	Alameda	Backhoe/front loader	1	8	Diesel	350	5/1/2019	6/30/2019	37
Road Construction	Alameda	1 ton crew cab 4x4	2	8	Diesel	300	5/8/2019	7/31/2019	56
Road Construction	Alameda	Road grader	2	8	Diesel	350	5/8/2019	7/31/2019	56
Road Construction	Alameda	Track type dozer	2	8	Diesel	350	5/8/2019	7/31/2019	56
Road Construction	Alameda	Drum type compactor	2	8	Diesel	250	5/8/2019	7/31/2019	56
Road Construction	Alameda	Water truck	2	6	Diesel	350	5/8/2019	7/31/2019	56
Road Construction	Alameda	Lowboy/truck/trailer	2	8	Diesel	500	5/8/2019	7/31/2019	56
Road Construction	Alameda	Backhoe/front loader	1	8	Diesel	350	5/8/2019	7/31/2019	56
Road Construction	Alameda	Excavator	1	8	Diesel	350	5/8/2019	7/31/2019	56
Road Construction	Alameda	Rock crusher	1	8	Diesel	350	5/8/2019	7/31/2019	56
Turbine foundations	Alameda	1 ton crew cab 4x4	2	8	Diesel	300	6/3/2019	8/31/2019	49
Turbine foundations	Alameda	Road grader	3	8	Diesel	350	6/3/2019	8/31/2019	49
Turbine foundations	Alameda	Track type dozer	3	8	Diesel	350	6/3/2019	8/31/2019	49
Turbine foundations	Alameda	Drum type compactor	3	8	Diesel	250	6/3/2019	8/31/2019	49
Turbine foundations	Alameda	Water truck	3	6	Diesel	350	6/3/2019	8/31/2019	49
Turbine foundations	Alameda	Lowboy/truck/trailer	3	8	Diesel	500	6/3/2019	8/31/2019	49
Turbine foundations	Alameda	Backhoe/front loader	3	8	Diesel	350	6/3/2019	8/31/2019	49
Turbine foundations	Alameda	Excavator	2	8	Diesel	350	6/3/2019	8/31/2019	49
Turbine foundations	Alameda	Rock crusher	1	8	Diesel	350	6/3/2019	8/31/2019	49
Turbine foundations	Alameda	Cement trucks	3	8	Diesel	335	6/3/2019	8/31/2019	49
Turbine delivery and installation	Alameda	Crane	2	8	Diesel	500	7/1/2019	10/31/2019	88
Turbine delivery and installation	Alameda	Lowboy/truck/trailer	2	8	Diesel	500	7/1/2019	10/31/2019	88
Turbine delivery and installation	Alameda	Excavator	2	8	Diesel	400	7/1/2019	10/31/2019	88
Utility Collector Line Installation	Alameda	1 ton crew cab 4x4	1	8	Diesel	300	6/15/2019	9/15/2019	76
Utility Collector Line Installation	Alameda	Water truck	1	6	Diesel	350	6/15/2019	9/15/2019	76
Utility Collector Line Installation	Alameda	Backhoe/front loader	1	8	Diesel	350	6/15/2019	9/15/2019	76
Utility Collector Line Installation	Alameda	Trencher	1	8	Diesel	350	6/15/2019	9/15/2019	76
Utility Collector Line Installation	Alameda	HDD Bore Machine	1	8	Diesel	350	6/15/2019	8/1/2019	37
O&M Building Construction	Alameda	Graders	1	8	Diesel	187	6/1/2019	6/4/2019	2
O&M Building Construction	Alameda	Tractors/Loaders/Backhoes	1	8	Diesel	97	6/1/2019	6/4/2019	2

O&M Building Construction	Alameda	Concrete/Industrial Saws	1	8	Diesel	81	6/5/2019	6/6/2019	2
O&M Building Construction	Alameda	Rubber Tired Dozers	1	1	Diesel	247	6/5/2019	6/6/2019	2
O&M Building Construction	Alameda	Tractors/Loaders/Backhoes	2	6	Diesel	97	6/5/2019	6/6/2019	2
O&M Building Construction	Alameda	Cranes	1	4	Diesel	231	6/7/2019	8/27/2019	58
O&M Building Construction	Alameda	Forklifts	2	6	Diesel	89	6/7/2019	8/27/2019	58
O&M Building Construction	Alameda	Tractors/Loaders/Backhoes	2	8	Diesel	97	6/7/2019	8/27/2019	58
O&M Building Construction	Alameda	Vendor truck	1	8	Diesel	300	6/7/2019	8/27/2019	58
O&M Building Construction	Alameda	Air Compressors	1	6	Diesel	78	8/28/2019	8/31/2019	4
Restoration and cleanup	Alameda	Road grader	3	8	Diesel	350	8/1/2019	11/30/2019	55
Restoration and cleanup	Alameda	Excavator	3	8	Diesel	350	8/1/2019	11/30/2019	55

Table 2. Construction Offsite Vehicles

Phase	County	Vehicle Type	Number/Day	Fuel Type	Miles/Trip	Total Trips	Start	End
WTG Machines, pads and substation materials	Alameda	Light Duty	3	Gasoline	1	360	5/1/2019	10/31/2019
WTG Machines, pads and substation materials	Alameda	Light Duty	3	Gasoline	1	360	5/1/2019	10/31/2019
WTG Machines, pads and substation materials	Alameda	Light Duty	3	Gasoline	23	360	5/1/2019	10/31/2019
WTG Machines, pads and substation materials	Alameda	Heavy Duty	4	Diesel	5	590	5/1/2019	10/31/2019
WTG Machines, pads and substation materials	Alameda	Heavy Duty	4	Diesel	1	590	5/1/2019	10/31/2019
WTG Machines, pads and substation materials	Alameda	Heavy Duty	4	Diesel	29	590	5/1/2019	10/31/2019
WTG Machines, pads and substation materials	Alameda	Heavy Duty	11	Diesel	6	1,430	5/1/2019	10/31/2019
WTG Machines, pads and substation materials	Alameda	Heavy Duty	11	Diesel	1	1,430	5/1/2019	10/31/2019
WTG Machines, pads and substation materials	Alameda	Heavy Duty	11	Diesel	19	1,430	5/1/2019	10/31/2019
Roads, WTG Foundations and Aggregate	Alameda	Light Duty	37	Gasoline	1	3,240	5/1/2019	8/31/2019
Roads, WTG Foundations and Aggregate	Alameda	Light Duty	37	Gasoline	1	3,240	5/1/2019	8/31/2019
Roads, WTG Foundations and Aggregate	Alameda	Light Duty	37	Gasoline	23	3,240	5/1/2019	8/31/2019
Roads, WTG Foundations and Aggregate	Alameda	Heavy Duty	57	Diesel	5	5,000	5/1/2019	8/31/2019
Roads, WTG Foundations and Aggregate	Alameda	Heavy Duty	57	Diesel	1	5,000	5/1/2019	8/31/2019
Roads, WTG Foundations and Aggregate	Alameda	Heavy Duty	57	Diesel	29	5,000	5/1/2019	8/31/2019
Roads, WTG Foundations and Aggregate	Alameda	Heavy Duty	8	Diesel	6	707	5/1/2019	8/31/2019

Roads, WTG Foundations and Aggregate	Alameda	Heavy Duty	8	Diesel	1	707	5/1/2019	8/31/2019
Roads, WTG Foundations and Aggregate	Alameda	Heavy Duty	8	Diesel	19	707	5/1/2019	8/31/2019
WTG Machines, pads and substation materials	San Joaquin	Heavy Duty	3	Diesel	56	357	5/1/2019	10/31/2019
WTG Machines, pads and substation materials	San Joaquin	Heavy Duty	2	Diesel	16	233	5/1/2019	10/31/2019
Roads, WTG Foundations and Aggregate	San Joaquin	Heavy Duty	34	Diesel	56	3,028	5/1/2019	8/31/2019
Roads, WTG Foundations and Aggregate	San Joaquin	Heavy Duty	22	Diesel	16	1,972	5/1/2019	8/31/2019
Worker Trips	Alameda	Light Duty	69	Gasoline	25	10,575	5/1/2019	11/30/2019

Table 3. Construction Site Disturbance

Phase	Total Acres
Laydown, substations and switch yards	35
Road Construction	53
Turbine foundations	110
Utility Collector Line Installation	47
O&M Building Construction	3
Restoration and cleanup	224

Table 4. O&M

Phase	County	Equipment Name	Number/Day	Hours/day	Fuel Type	HP	Start	End	Working Days	Daily Miles	Total Acres
Maintenance/Operation	Alameda	1 ton crew cab 4x4	2	4	Diesel	300	1/1/2020	12/31/2020	262	120	-
Maintenance/Operation	Alameda	Road grader	1	8	Diesel	350	1/1/2020	1/7/2020	5	-	1.00
Maintenance/Operation	Alameda	Crane	1	8	Diesel	500	1/1/2020	1/7/2020	5	-	-
Maintenance/Operation	Alameda	Lowboy/truck/trailer	1	2	Diesel	500	1/1/2020	1/14/2020	10	30	-
Maintenance/Operation	Alameda	Generator	2	2	Diesel	100	1/1/2020	12/31/2020	262	-	-
Worker Trips	Alameda	Light Duty	2	-	Gasoline	-	1/1/2020	12/31/2020	262	213	-

Appendix C

Plant and Animal Species Lists

CNPS California Native Plant Society Inventory of Rare and Endangered Plants

Plant List

65 matches found. *Click on scientific name for details*

Search Criteria

Found in Quads 3712175, 3712176, 3712186, 3712185, 3712184, 3712174, 3712164, 3712165, 3712166, 3712156 3712155 and 3712154;

Modify Search Criteria Export to Excel Modify Columns Modify Sort Display Photos

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
Acanthomintha lanceolata	Santa Clara thorn-mint	Lamiaceae	annual herb	Mar-Jun	4.2	S4	G4
Allium sharsmithiae	Sharsmith's onion	Alliaceae	perennial bulbiferous herb	Mar-May	1B.3	S2	G2
Amsinckia grandiflora	large-flowered fiddleneck	Boraginaceae	annual herb	(Mar)Apr-May	1B.1	S1	G1
Amsinckia lunaris	bent-flowered fiddleneck	Boraginaceae	annual herb	Mar-Jun	1B.2	S3	G3
Androsace elongata ssp. acuta	California androsace	Primulaceae	annual herb	Mar-Jun	4.2	S3S4	G5?T3T4
Aspidotis carlotta-halliae	Carlotta Hall's lace fern	Pteridaceae	perennial rhizomatous herb	Jan-Dec	4.2	S3	G3
Astragalus tener var. tener	alkali milk-vetch	Fabaceae	annual herb	Mar-Jun	1B.2	S2	G2T2
Atriplex cordulata var. cordulata	heartscale	Chenopodiaceae	annual herb	Apr-Oct	1B.2	S2	G3T2
Atriplex coronata var. coronata	crownscale	Chenopodiaceae	annual herb	Mar-Oct	4.2	S3	G4T3
Atriplex coronata var. vallicola	Lost Hills crownscale	Chenopodiaceae	annual herb	Apr-Sep	1B.2	S2	G4T2
Atriplex depressa	brittlescale	Chenopodiaceae	annual herb	Apr-Oct	1B.2	S2	G2
Atriplex minuscula	lesser saltscale	Chenopodiaceae	annual herb	May-Oct	1B.1	S2	G2
Balsamorhiza macrolepis	big-scale balsamroot	Asteraceae	perennial herb	Mar-Jun	1B.2	S2	G2
Blepharizonia plumosa	big tarplant	Asteraceae	annual herb	Jul-Oct	1B.1	S1S2	G1G2
Calochortus pulchellus	Mt. Diablo fairy-lantern	Liliaceae	perennial bulbiferous herb	Apr-Jun	1B.2	S2	G2
Campanula exigua	chaparral harebell	Campanulaceae	annual herb	May-Jun	1B.2	S2	G2
Carex comosa	bristly sedge	Cyperaceae	perennial rhizomatous herb	May-Sep	2B.1	S2	G5
Caulanthus lemmonii	Lemmon's jewelflower	Brassicaceae	annual herb	Feb-May	1B.2	S3	G3
Centromadia parryi ssp. congdonii	Congdon's tarplant	Asteraceae	annual herb	May-Oct(Nov)	1B.1	S2	G3T2
Centromadia parryi ssp. rudis	Parry's rough tarplant	Asteraceae	annual herb	May-Oct	4.2	S3	G3T3
Chlorogalum pomeridianum var. minus	dwarf soaproot	Agavaceae	perennial bulbiferous herb	May-Aug	1B.2	S3	G5T3
Chloropyron molle ssp. hispidum	hispid bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	Jun-Sep	1B.1	S1	G2T1
Chloropyron palmatum	palmate-bracted bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	May-Oct	1B.1	S1	G1
Cirsium fontinale var. campylon	Mt. Hamilton fountain thistle	Asteraceae	perennial herb	(Feb)Apr-Oct	1B.2	S2	G2T2
Clarkia breweri	Brewer's clarkia	Onagraceae	annual herb	Apr-Jun	4.2	S4	G4
Clarkia concinna ssp. automixa	Santa Clara red ribbons	Onagraceae	annual herb	(Apr)May-Jun (Jul)	4.3	S3	G5?T3
Convolvulus simulans	small-flowered morning-glory	Convolvulaceae	annual herb	Mar-Jul	4.2	S4	G4
Deinandra bacigalupii	Livermore tarplant	Asteraceae	annual herb	Jun-Oct	1B.1	S1	G1
Delphinium californicum ssp. interius	Hospital Canyon larkspur	Ranunculaceae	perennial herb	Apr-Jun	1B.2	S3	G3T3
Delphinium recurvatum	recurved larkspur	Ranunculaceae	perennial herb	Mar-Jun	1B.2	S2?	G2?
Eriophyllum jepsonii	Jepson's woolly sunflower	Asteraceae	perennial herb	Apr-Jun	4.3	S3	G3
Eryngium racemosum	Delta button-celery	Apiaceae	annual / perennial herb	Jun-Oct	1B.1	S1	G1

Eryngium spinosepalum	spiny-sepaled button-celery	Apiaceae	annual / perennial herb	Apr-Jun	1B.2	S2	G2
Eschscholzia rhombipetala	diamond-petaled California poppy	Papaveraceae	annual herb	Mar-Apr	1B.1	S1	G1
Extriplex joaquinana	San Joaquin spearscale	Chenopodiaceae	annual herb	Apr-Oct	1B.2	S2	G2
Fritillaria agrestis	stinkbells	Liliaceae	perennial bulbiferous herb	Mar-Jun	4.2	S3	G3
Fritillaria falcata	talus fritillary	Liliaceae	perennial bulbiferous herb	Mar-May	1B.2	S2	G2
Helianthella castanea	Diablo helianthella	Asteraceae	perennial herb	Mar-Jun	1B.2	S2	G2
Hesperevax caulescens	hogwallow starfish	Asteraceae	annual herb	Mar-Jun	4.2	S3	G3
Hesperolinon breweri	Brewer's western flax	Linaceae	annual herb	May-Jul	1B.2	S2	G2
Hibiscus lasiocarpos var. occidentalis	woolly rose-mallow	Malvaceae	perennial rhizomatous herb (emergent)	Jun-Sep	1B.2	S3	G5T3
Hoita strobilina	Loma Prieta hoita	Fabaceae	perennial herb	May-Jul(Aug-Oct)	1B.1	S2?	G2?
Lasthenia conjugens	Contra Costa goldfields	Asteraceae	annual herb	Mar-Jun	1B.1	S1	G1
Lasthenia ferrisiae	Ferris' goldfields	Asteraceae	annual herb	Feb-May	4.2	S3	G3
Lathyrus jepsonii var. jepsonii	Delta tule pea	Fabaceae	perennial herb	May-Jul(Aug-Sep)	1B.2	S2	G5T2
Legenere limosa	legenere	Campanulaceae	annual herb	Apr-Jun	1B.1	S2	G2
Leptosiphon ambiguus	serpentine leptosiphon	Polemoniaceae	annual herb	Mar-Jun	4.2	S4	G4
Leptosyne hamiltonii	Mt. Hamilton coreopsis	Asteraceae	annual herb	Mar-May	1B.2	S2	G2
Lilaeopsis masonii	Mason's lilaeopsis	Apiaceae	perennial rhizomatous herb	Apr-Nov	1B.1	S2	G2
Limosella australis	Delta mudwort	Scrophulariaceae	perennial stoloniferous herb	May-Aug	2B.1	S2	G4G5
Madia radiata	showy golden madia	Asteraceae	annual herb	Mar-May	1B.1	S3	G3
Malacothamnus hallii	Hall's bush-mallow	Malvaceae	perennial evergreen shrub	(Apr)May-Sep (Oct)	1B.2	S2	G2
Micropus amphibolus	Mt. Diablo cottonweed	Asteraceae	annual herb	Mar-May	3.2	S3S4	G3G4
Myosurus minimus ssp. apus	little mousetail	Ranunculaceae	annual herb	Mar-Jun	3.1	S2	G5T2Q
Navarretia nigelliformis ssp. nigelliformis	adobe navarretia	Polemoniaceae	annual herb	Apr-Jun	4.2	S3	G4T3
Navarretia nigelliformis ssp. radians	shining navarretia	Polemoniaceae	annual herb	(Mar)Apr-Jul	1B.2	S2	G4T2
Oenothera deltoides ssp. howellii	Antioch Dunes evening-primrose	Onagraceae	perennial herb	Mar-Sep	1B.1	S1	G5T1
Plagiobothrys glaber	hairless popcornflower	Boraginaceae	annual herb	Mar-May	1A	SH	GH
Puccinellia simplex	California alkali grass	Poaceae	annual herb	Mar-May	1B.2	S2	G3
Scutellaria galericulata	marsh skullcap	Lamiaceae	perennial rhizomatous herb	Jun-Sep	2B.2	S2	G5
Senecio aphanactis	chaparral ragwort	Asteraceae	annual herb	Jan-Apr(May)	2B.2	S2	G3
Spergularia macrotheca var. longistyla	long-styled sand-spurrey	Caryophyllaceae	perennial herb	Feb-May	1B.2	S2	G5T2
Symphyotrichum lentum	Suisun Marsh aster	Asteraceae	perennial rhizomatous herb	(Apr)May-Nov	1B.2	S2	G2
Trifolium hydrophilum	saline clover	Fabaceae	annual herb	Apr-Jun	1B.2	S2	G2
Tropidocarpum capparideum	caper-fruited tropidocarpum	Brassicaceae	annual herb	Mar-Apr	1B.1	S1	G1

Suggested Citation

California Native Plant Society, Rare Plant Program. 2019. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website http://www.rareplants.cnps.org [accessed 30 January 2019].

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Midway (3712165) OR Clifton Court Forebay (3712175) OR Brentwood (3712186) OR Woodward Island (3712185) OR Holt (3712184) OR Union Island (3712174) OR Tracy (3712164) OR Lone Tree Creek (3712154) OR Cedar Mtn. (3712155) OR Mendenhall Springs (3712156) OR Altamont (3712166) OR Byron Hot Springs (3712176))
 AND Taxonomic Group IS (Fish OR Amphibians OR Reptiles OR Birds OR Mammals OR Mollusks OR Arachnids OR Crustaceans OR Insects)

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Accipiter cooperii Cooper's hawk	ABNKC12040	None	None	G5	S4	WL
Agelaius tricolor tricolored blackbird	ABPBXB0020	None	Candidate Endangered	G2G3	S1S2	SSC
Ambystoma californiense California tiger salamander	AAAAA01180	Threatened	Threatened	G2G3	S2S3	WL
Ammodramus savannarum grasshopper sparrow	ABPBXA0020	None	None	G5	S3	SSC
Anniella pulchra northern California legless lizard	ARACC01020	None	None	G3	S3	SSC
Antrozous pallidus pallid bat	AMACC10010	None	None	G5	S3	SSC
Aquila chrysaetos golden eagle	ABNKC22010	None	None	G5	S3	FP
Ardea herodias great blue heron	ABNGA04010	None	None	G5	S4	
Arizona elegans occidentalis California glossy snake	ARADB01017	None	None	G5T2	S2	SSC
Asio flammeus short-eared owl	ABNSB13040	None	None	G5	S3	SSC
Athene cunicularia burrowing owl	ABNSB10010	None	None	G4	S3	SSC
Bombus crotchii Crotch bumble bee	IIHYM24480	None	None	G3G4	S1S2	
Bombus occidentalis western bumble bee	IIHYM24250	None	None	G2G3	S1	
Branchinecta longiantenna longhorn fairy shrimp	ICBRA03020	Endangered	None	G1	S1S2	
Branchinecta lynchi vernal pool fairy shrimp	ICBRA03030	Threatened	None	G3	S3	
Branchinecta mesovallensis midvalley fairy shrimp	ICBRA03150	None	None	G2	S2S3	
Buteo regalis ferruginous hawk	ABNKC19120	None	None	G4	S3S4	WL

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Buteo swainsoni Swainson's hawk	ABNKC19070	None	Threatened	G5	S3	
Circus hudsonius northern harrier	ABNKC11011	None	None	G5	S3	SSC
Corynorhinus townsendii Townsend's big-eared bat	AMACC08010	None	None	G3G4	S2	SSC
Desmocerus californicus dimorphus valley elderberry longhorn beetle	IICOL48011	Threatened	None	G3T2	S2	
Dipodomys heermanni berkeleyensis Berkeley kangaroo rat	AMAFD03061	None	None	G3G4T1	S1	
Elanus leucurus white-tailed kite	ABNKC06010	None	None	G5	S3S4	FP
Emys marmorata western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
Eremophila alpestris actia California horned lark	ABPAT02011	None	None	G5T4Q	S4	WL
Eumops perotis californicus western mastiff bat	AMACD02011	None	None	G5T4	S3S4	SSC
Falco mexicanus prairie falcon	ABNKD06090	None	None	G5	S4	WL
Haliaeetus leucocephalus bald eagle	ABNKC10010	Delisted	Endangered	G5	S3	FP
Hygrotus curvipes curved-foot hygrotus diving beetle	IICOL38030	None	None	G1	S1	
Hypomesus transpacificus Delta smelt	AFCHB01040	Threatened	Endangered	G1	S1	
Lanius ludovicianus loggerhead shrike	ABPBR01030	None	None	G4	S4	SSC
Lasiurus cinereus hoary bat	AMACC05030	None	None	G5	S4	
Laterallus jamaicensis coturniculus California black rail	ABNME03041	None	Threatened	G3G4T1	S1	FP
Linderiella occidentalis California linderiella	ICBRA06010	None	None	G2G3	S2S3	
Lytta molesta molestan blister beetle	IICOL4C030	None	None	G2	S2	
Masticophis flagellum ruddocki San Joaquin coachwhip	ARADB21021	None	None	G5T2T3	S2?	SSC
Masticophis lateralis euryxanthus Alameda whipsnake	ARADB21031	Threatened	Threatened	G4T2	S2	
Melospiza melodia song sparrow ("Modesto" population)	ABPBXA3010	None	None	G5	S3?	SSC

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Oncorhynchus mykiss irideus pop. 11 steelhead - Central Valley DPS	AFCHA0209K	Threatened	None	G5T2Q	S2	
Perdita scitula antiochensis Antioch andrenid bee	IIHYM01031	None	None	G1T1	S1	
Perognathus inornatus San Joaquin Pocket Mouse	AMAFD01060	None	None	G2G3	S2S3	
Phrynosoma blainvillii coast horned lizard	ARACF12100	None	None	G3G4	S3S4	SSC
Rana boylii foothill yellow-legged frog	AAABH01050	None	Candidate Threatened	G3	S3	SSC
Rana draytonii California red-legged frog	AAABH01022	Threatened	None	G2G3	S2S3	SSC
Spea hammondii western spadefoot	AAABF02020	None	None	G3	S3	SSC
Spirinchus thaleichthys longfin smelt	AFCHB03010	Candidate	Threatened	G5	S1	SSC
Sylvilagus bachmani riparius riparian brush rabbit	AMAEB01021	Endangered	Endangered	G5T1	S1	
Taxidea taxus American badger	AMAJF04010	None	None	G5	S3	SSC
Thaleichthys pacificus eulachon	AFCHB04010	Threatened	None	G5	S3	
Thamnophis gigas giant gartersnake	ARADB36150	Threatened	Threatened	G2	S2	
Vireo bellii pusillus least Bell's vireo	ABPBW01114	Endangered	Endangered	G5T2	S2	
Vulpes macrotis mutica San Joaquin kit fox	AMAJA03041	Endangered	Threatened	G4T2	S2	

Record Count: 52

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

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 AND Taxonomic Group IS (Ferns OR Gymnosperms OR Monocots OR Dicots OR Lichens OR Bryophytes)

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Allium sharsmithiae Sharsmith's onion	PMLIL02310	None	None	G2	S2	1B.3
Amsinckia grandiflora large-flowered fiddleneck	PDBOR01050	Endangered	Endangered	G1	S1	1B.1
Arctostaphylos manzanita ssp. laevigata Contra Costa manzanita	PDERI04273	None	None	G5T2	S2	1B.2
Astragalus tener var. tener alkali milk-vetch	PDFAB0F8R1	None	None	G2T1	S1	1B.2
Atriplex cordulata var. cordulata heartscale	PDCHE040B0	None	None	G3T2	S2	1B.2
Atriplex depressa brittlescale	PDCHE042L0	None	None	G2	S2	1B.2
Atriplex minuscula lesser saltscale	PDCHE042M0	None	None	G2	S2	1B.1
Balsamorhiza macrolepis big-scale balsamroot	PDAST11061	None	None	G2	S2	1B.2
Blepharizonia plumosa big tarplant	PDAST1C011	None	None	G1G2	S1S2	1B.1
Calochortus pulchellus Mt. Diablo fairy-lantern	PMLIL0D160	None	None	G2	S2	1B.2
Campanula exigua chaparral harebell	PDCAM020A0	None	None	G2	S2	1B.2
Carex comosa bristly sedge	PMCYP032Y0	None	None	G5	S2	2B.1
Caulanthus lemmonii Lemmon's jewelflower	PDBRA0M0E0	None	None	G3	S3	1B.2
Centromadia parryi ssp. congdonii Congdon's tarplant	PDAST4R0P1	None	None	G3T2	S2	1B.1
Chlorogalum pomeridianum var. minus dwarf soaproot	PMLIL0G042	None	None	G5T3	S3	1B.2
Chloropyron molle ssp. hispidum hispid salty bird's-beak	PDSCR0J0D1	None	None	G2T1	S1	1B.1
Chloropyron palmatum palmate-bracted bird's-beak	PDSCR0J0J0	Endangered	Endangered	G1	S1	1B.1

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Cicuta maculata var. bolanderi Bolander's water-hemlock	PDAPI0M051	None	None	G5T4	S2	2B.1
Cirsium fontinale var. campylon Mt. Hamilton fountain thistle	PDAST2E163	None	None	G2T2	S2	1B.2
Clarkia concinna ssp. automixa Santa Clara red ribbons	PDONA050A1	None	None	G5?T3	S3	4.3
Deinandra bacigalupii Livermore tarplant	PDAST4R0V0	None	Endangered	G1	S1	1B.1
Delphinium californicum ssp. interius Hospital Canyon larkspur	PDRAN0B0A2	None	None	G3T3	S3	1B.2
Delphinium recurvatum recurved larkspur	PDRAN0B1J0	None	None	G2?	S2?	1B.2
Eryngium racemosum Delta button-celery	PDAPI0Z0S0	None	Endangered	G1	S1	1B.1
Eryngium spinosepalum spiny-sepaled button-celery	PDAPI0Z0Y0	None	None	G2	S2	1B.2
Eschscholzia rhombipetala diamond-petaled California poppy	PDPAP0A0D0	None	None	G1	S1	1B.1
Extriplex joaquinana San Joaquin spearscale	PDCHE041F3	None	None	G2	S2	1B.2
Fritillaria agrestis stinkbells	PMLIL0V010	None	None	G3	S3	4.2
Fritillaria falcata talus fritillary	PMLIL0V070	None	None	G2	S2	1B.2
Helianthella castanea Diablo helianthella	PDAST4M020	None	None	G2	S2	1B.2
Hesperolinon breweri Brewer's western flax	PDLIN01030	None	None	G2	S2	1B.2
Hibiscus lasiocarpos var. occidentalis woolly rose-mallow	PDMAL0H0R3	None	None	G5T3	S3	1B.2
Hoita strobilina Loma Prieta hoita	PDFAB5Z030	None	None	G2?	S2?	1B.1
Lathyrus jepsonii var. jepsonii Delta tule pea	PDFAB250D2	None	None	G5T2	S2	1B.2
Legenere limosa legenere	PDCAM0C010	None	None	G2	S2	1B.1
Leptosyne hamiltonii Mt. Hamilton coreopsis	PDAST2L0C0	None	None	G2	S2	1B.2
Lilaeopsis masonii Mason's lilaeopsis	PDAPI19030	None	Rare	G2	S2	1B.1
Limosella australis Delta mudwort	PDSCR10030	None	None	G4G5	S2	2B.1

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Madia radiata showy golden madia	PDAST650E0	None	None	G3	S3	1B.1
Malacothamnus hallii Hall's bush-mallow	PDMAL0Q0F0	None	None	G2	S2	1B.2
Navarretia nigelliformis ssp. radians shining navarretia	PDPLM0C0J2	None	None	G4T2	S2	1B.2
Oenothera deltoides ssp. howellii Antioch Dunes evening-primrose	PDONA0C0B4	Endangered	Endangered	G5T1	S1	1B.1
Phacelia phacelioides Mt. Diablo phacelia	PDHYD0C3Q0	None	None	G2	S2	1B.2
Plagiobothrys glaber hairless popcornflower	PDBOR0V0B0	None	None	GH	SH	1A
Puccinellia simplex California alkali grass	PMPOA53110	None	None	G3	S2	1B.2
Scutellaria galericulata marsh skullcap	PDLAM1U0J0	None	None	G5	S2	2B.2
Senecio aphanactis chaparral ragwort	PDAST8H060	None	None	G3	S2	2B.2
Spergularia macrotheca var. longistyla long-styled sand-spurrey	PDCAR0W062	None	None	G5T2	S2	1B.2
Symphyotrichum lentum Suisun Marsh aster	PDASTE8470	None	None	G2	S2	1B.2
Trifolium hydrophilum saline clover	PDFAB400R5	None	None	G2	S2	1B.2
Tropidocarpum capparideum caper-fruited tropidocarpum	PDBRA2R010	None	None	G1	S1	1B.1

Record Count: 51

Appendix D
Water Supply Assessment

Memorandum

To:	Korina Cassidy, Sand Hill Wind, LLC
From:	Katrina Sukola, Cory Matsui and Brad Norton
Date:	August 3, 2018
Re:	**Sand Hill Wind Repowering Project Water Supply Assessment**

1.0 Introduction

The purpose of this memorandum is to convey the findings of a water supply assessment (WSA) for the construction and operation of the Sand Hill Wind Repowering Project. Section 10912 of the California Water Code requires that proponents of projects as defined under the California Environmental Quality Act (CEQA) ensure that there is an adequate water supply for the project. The code specifies that a WSA is needed for residential projects of more than 500 dwelling units or equivalent size, or for industrial plants occupying 40 or more acres. While the proposed project would only involve permanent impacts of 21 acres, construction would temporarily disturb approximately 223 acres; accordingly, in the interest of full disclosure, Sand Hill has elected to prepare this WSA.

In 2011, the legislature adopted an express WSA exemption for wind and solar projects using 75 acre-feet (af) per year (afy) or less, largely in response to a CEQA decision involving a use that could be analogous to wind and solar projects. That exemption expired on January 1, 2018; accordingly, this WSA has been prepared to support the project's CEQA analysis and demonstrate that there is an adequate water supply for the project.

The California Water Code (§10910 et. seq.), based on Senate Bill 610 of 2001 (SB 610), requires a project proponent to assess the reliability of a project's water supply as part of the California Environmental Quality Act (CEQA) process. The guidebook for Implementation of Senate Bill 610 of 2001 is designed to provide step-by-step suggestions for completing an SB 610 water assessment, including 1) Documenting supply (surface and groundwater); 2) Documenting project demand – existing and future use; 3) Documenting dry-year(s) supply; and 4) Documenting dry-year(s) demand.

2.0 Project Description

Sand Hill Wind, LLC (Sand Hill) is proposing the Sand Hill Wind Repowering Project (project or proposed project) in the Altamont Pass Wind Resource Area (APWRA) (Figure 1). The proposed project would entail installation of up to 40 new wind turbines with generating capacities between 2.3 and 4.0 megawatts (MW) to develop up to 144.5 MW. Existing roads would be used where possible, and temporary widening and some new roads would be necessary. The project would require three generation-tie lines connecting the project to two substations.

The project area comprises 15 privately owned parcels, most of which were previously used for wind production. Land use in the project area and the surrounding APWRA consists largely of cattle-grazed land supporting operating wind turbines and ancillary facilities. Generally characterized by rolling foothills of annual grassland, the mostly treeless region is steeper on the west and gradually flatter to the east where it slopes toward the floor of the Central Valley. Elevations in the area range from approximately 100 to 600 feet above sea level. Sand Hill has lease agreements with the landowners to install, operate, and maintain the repowered wind turbines while allowing ongoing agricultural activities to continue.

3.0 Water Supply

The California Urban Water Management Planning Act (§10610 et. seq. of the CWC) requires urban water suppliers providing over 3,000 afy of water or having a minimum of 3,000 service connections to prepare plans (Urban Water Management Plans or UWMPs) on a five-year, ongoing basis. An UWMP must demonstrate the continued ability of the provider to serve customers with water supplies that meet current and future expected demands under normal, single dry, and multiple dry year scenarios. These plans must also include the assessment of urban water conservation measures and wastewater recycling. Pursuant to Section 10632 of the CWC, the plans must also include a water shortage contingency plan outlining how the water provider will manage water shortages, including shortages of up to fifty percent (50%) of their normal supplies, and catastrophic interruptions of water supply.

Water supply is likely to be provided by one of two water districts: Zone 7 of the Alameda County Flood Control and Water Conservation District (Zone 7) or the City of Tracy Water District. Zone 7 Water Agency and the City of Tracy are both required to prepare UWMPs. Water supply for project construction would be trucked in to the project from the nearest available source. The project is within the Zone 7 service area, and water would likely be obtained from Zone 7, however water may also be obtained from the City of Tracy. Water supply for project operations would be provided by a new groundwater well. Each potential water supply source is briefly described below.

3.1 Zone 7 Water Agency

Zone 7 is almost exclusively a water wholesaler that provides water for municipal and industrial purposes indirectly through four retail urban water suppliers. Under Zone 7's Groundwater Management Program, Zone 7 administers oversight of the local groundwater basin—the Livermore Valley Groundwater Basin—and prevents groundwater overdraft. Furthermore, the recently enacted Sustainable Groundwater Management Act of 2014 designates Zone 7 as the exclusive local agency to become the Groundwater Sustainability Agency for the groundwater basins within its statutory boundaries. The Project is located in the northeast section of the Zone 7 service area.

Zone 7's most recent Urban Water Management Plan (2015 UWMP) was adopted in March 2016. Zone 7's 2015 UWMP projected demands for 20 years through the year 2035. As provided for in the State law, this WSA incorporates by reference and relies upon many of the planning assumptions and projections of the 2015 UWMP in assessing the water demands of the proposed Project relative to the overall increase in water demands expected within the entire water service area. Current water uses or demands in the Zone 7 service area is 47,900 af while total and projected water demand in 2035 is 92,800 af. The 2015 UWMP demand projections are lower than the 2010 UWMP projections due to new recycled water projects and water conservation programs being implemented by water retailer. Zone 7 will continue to re-evaluate demand trends annual (Zone 7 Water Agency 2016).

3.2 City of Tracy Water District

The City of Tracy (City) is its own water retailer, receiving water from two wholesale surface water supplies: the U.S. Bureau of Reclamation and the South San Joaquin Irrigation District. The City also owns nine groundwater production wells and a water treatment plant. Tracy's existing incorporated area encompasses approximately 22 square miles. The sphere of influence (SOI) is the area outside the city limits that Tracy expects to annex and urbanize in the future, including the expected physical limit of the city based on the most current available information. During the City's most recent General Plan update process, revisions to the SOI were made to more accurately reflect the areas where Tracy may grow in the future and locations where no urban growth is expected. The revised SOI is approximately 42 square miles, or 20 square miles larger than the current city limits. The project is outside of the SOI.

The City of Tracy's most recent UWMP (2015 UWMP) was adopted in July 2016. The City's 2015 UWMP projected demands for 25 years through the year 2040. The City experienced a significant decrease in demand in 2015, with total potable water demand decreasing by approximately 19% from the 2011 through 2014 average. This decrease in demand is likely attributable to the severe drought conditions that persisted into 2015 and the mandatory state-wide restrictions in urban water use imposed by the State Water Resources Control Board. However, actual water use in the City in 2015 was much lower than the assumed baseline water use1, and projections in the 2015 UWMP anticipate a significant rebound in demand between 2015 and 2020. The City's potable water demand is projected to increase by nearly 44% from 14,041 in 2015 to 20,185 afy in 2020. The City's projected potable water demand in 2040 is 27, 537 afy, and water demand at Buildout2 is 37,444 afy. Water demand of potable water is expected to increase more than 200% within the industrial sector alone. Water demand projections assume single and multi-family residential water use would decrease by 10% by 2040. The City's baseline water use is projected to decrease over the forecasted timeframe as current water users become more efficient, active conservation measures designed to reduce per capita water use are implemented by the City and as recycled water supplies become available (EKI 2016).

3.2 Groundwater

Due to the rocky under layer and slopes in the project area, the project site is not located within a recognized groundwater basin. However, water deposits may be found in small aquifers, which are not recognized as DWR groundwater basins. The site is located between two groundwater basins, discussed further below.

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[1] The existing baseline water use is 16,626 afy.

[2] The City of Tracy Buildout demands calculated for each planned development in the Water System Master Plan were intentionally designed to be conservative, and may therefore overstate the actually demand that would be observed at Buildout. Buildout is not anticipated to occur by or before 2040.

Livermore Valley Groundwater Basin

The Livermore Valley lies about 40 miles east of San Francisco and 30 miles southwest of Stockton within a structural trough of the Diablo Range. The groundwater basin extends from the Pleasanton Ridge east to the Altamont Hills (about 14 miles) and from the Livermore Upland north to the Orinda Upland (about 3 miles). Some geologic structures restrict the lateral movement of groundwater, but the general groundwater gradient is to the west then south toward Arroyo de la Laguna. Elevations in the basin range from about 600 feet in the east, near the Altamont Hills, to about 280 feet in the southwest, where Arroyo de la Laguna flows into Sunol Groundwater Basin. (California Department of Water Resources 2006a).

Long-term natural sustainable yield is contractually defined as the average amount of groundwater annually replenished by natural recharge in the Main Basin[3] through percolation of rainfall, natural stream flow, and irrigation waters and the inflow of subsurface waters; hence, it reflects the amount that can be pumped without lowering the long-term average groundwater volume in storage. In contrast, *artificial recharge* is the aquifer replenishment that results from artificially induced or enhanced stream flow. With artificial recharge, more groundwater can be sustainably extracted from the Main Basin each year.

Zone 7 established historic lows based on the lowest measured groundwater elevations in various wells in the Main Basin. The difference between water surface elevations when the Main Basin is full and water surface elevations when the Main Basin is at historic lows defines Zone 7's operational storage. Of the estimated total storage capacity of 254,000 af, operational storage is about 126,000 af based on Zone 7's experience operating the Main Basin, with the remaining 128,000 af considered emergency reserve storage (Zone 7 Water Agency Staff 2016).

San Joaquin Valley Groundwater Basin and Tracy Subbasin

The San Joaquin Valley comprises the southernmost portion of the Great Valley Geomorphic Province of California. The Great Valley is a broad structural trough bounded by the tilted block of the Sierra Nevada on the east and the complexly folded and faulted Coast Ranges on the west. The Tracy subbasin is bounded by the Diablo Range on the west; the Mokelumne and San Joaquin Rivers on the north; the San Joaquin River to the east; and the San Joaquin–Stanislaus County line on the south. The Tracy subbasin is drained by the San Joaquin River and one of its major westside tributaries, Corral Hollow Creek. The San Joaquin River flows north into the Sacramento–San Joaquin Delta and discharges into the San Francisco Bay. Areas of poor water quality exist throughout the subbasin: along the western side of the subbasin, in the vicinity of Tracy, and along the San Joaquin River (California Department of Water Resources 2006b).

4.0 Project Water Demand

4.1 Construction Water Demand

Water would be required during construction for dust control and for ground-disturbing activities. Construction of the proposed project is anticipated to involve the grading of approximately 2.7

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[3] The *Main Basin* is the portion of the Livermore Valley Groundwater Basin that contains high-yielding aquifers and generally the best quality groundwater.

million square feet (295,000 square yards), requiring the application of water to control dust. Grading is anticipated to last approximately 234 days, with one water truck operating 6 hours each day. A water truck used for dust control would apply water at a rate of 0.2 gallon per square yard per hour, requiring approximately 22,443,534 gallons (69 acre-feet) over the duration of project construction. The rate of water application is an assumption based on a value cited by the U.S. Environmental Protection Agency that would result in a control efficiency of approximately 50% of emissions of particulate matter greater than 10 microns in diameter (PM10) (U.S. Environmental Protection Agency 1992).

4.2 Operations Water Demand

Because the production of wind energy itself does not require water, there would be no substantial water demand during operation of the wind turbines. The project would include an onsite operations and maintenance (O&M) facility with permanent restroom facilities. The U.S. Environmental Protection Agency estimates that each employee in a commercial and industrial setting uses between 20 and 35 gallons per day (U.S. Environmental Protection Agency 2017). Accordingly, a staff of four using 35 gallons per day for 250 work days per year would constitute a maximum operational water demand of approximately 35,000 gallons per year (0.11 afy).

5.0 Project Water Supply

Water supply for the O&M building would be provided by an onsite groundwater well. The western edge of the project area is approximately 5 miles east of the Livermore Valley Groundwater Basin. The eastern edge of the project area is just within the western limit of the San Joaquin Valley Groundwater Basin; however, the two possible sites for the O&M building are roughly equidistant between the two basins. Only a very few domestic groundwater wells have been developed in the project vicinity, with well depths ranging between 55 and 700 feet (California Department of Water Resources 2018).

Zone 7's water supply has two major components; 1) incoming water supplies available through contracts and water rights and 2) accumulated water supplies in storage. Zone 7 obtains the preponderance of its water from the State Water Project (SWP). To optimize use of local resources, Zone 7 practices conjunctive use of the Livermore Valley Groundwater Basin and store local runoff from Arroyo Valle in Lake Del Valle. Modeling and analysis indicates that the current average inflows available to Zone 7 are approximately 7,300 acre-feet annually (AFA). Increased yield from this water supply in the future would be available through the construction of the Chain Lakes (Zone 7 Water Agency 2016.

Zone 7 does not anticipate any difficulty meeting projected water demands in normal or multiple drought year scenarios through at least 2035. It projects a minimum water surplus of 6,545 af for all scenarios and years estimated in the agency's Urban Water Management Plan (Zone 7 Water Agency Staff 2016). Accordingly, the proposed project's total construction water demand of 69 af would not present any supply challenges to Zone 7, because the anticipated water surpluses each year would be multiple orders of magnitude greater than the proposed project's temporary construction water demand.

Tracy currently has contracts to receive 20,000 afy from the Central Valley Project and another 10,000 afy from the Stanislaus River. The City projects adequate water supplies through 2040 and is thus anticipated to be able to meet projected demand. Under normal year conditions, the City is expecting a water surplus of more than 7,200 af in 2020, 2025, 2030, 2035, and 2040 (City of Tracy 2016). Given that the proposed project would consume an estimated 69 af over a period of several months during construction, there would be sufficient supply to provide the project with the entirety of its construction-related demand.

6.0 Dry Year Supply and Demand

6.1 Dry Year Supply

The quantity of supply available from each Zone 7 water supply source varies from year to year and is dependent on hydrologic conditions. Projected yield for each water supply source was projected under three conditions: normal water year, single-dry year, and multi-dry year. Projections of available water supply from the SWP in the 2020 through 2035 period indicate in a single-dry year, 8 percent of water would be available compared to 100 percent during a normal water year, and 25 to 42 perfect would be available during multiple dry years. However, as a SWP contractor, Zone 7 has the ability to carry water from one year to the next in San Luis Reservoir, with the water amount dependent on DWR allocations for that year. Typically, any carryover into a normal water year would be used in that year, and similar amount of current year supply would also be carried over for use in the following year. Typically, Zone 7 carries approximately 10,000 af of water from one year into the next. Maximum carryover available to Zone 7 for use in the 2020 through 2035 period is 100 percent in normal, single-dry, and multiple-dry water years (Zone 7 Water Agency 2016).

During dry water years, water is primarily available under the Yuba Accord. Although the amount is small (400 af in 2014 and approximately 300 af in 2015), for planning purposes a long-term average yield from the 2020 through 2035 period in a normal water of 145 AFA and 676 AFA during dry conditions is assumed. The amounts may increase as terms are renegotiated. The projected average yield of water supply in single-dry and multiple-dry water years is 470 percent compared to the normal water year.

In addition, during dry years, water supply would be available from storage sources. To augment water supplies during drought conditions, Zone 7 has 78,000 af and 120,000 af of groundwater banking storage capacity available through Semitropic Water Storage District and Cawalo Water District, respectively. Further, Zone 7 is working with water retailers to investigate the feasibility of potable reuse projects to provide new water supplies within Zone 7's service area. To assess the reliability of Zone 7's water supply during normal, single-dry, and multiple-dry years, projected water supplies were compared to projected water demand, and summarized in Table 1. Considering existing and planned water supplies, Zone 7 does not anticipate any difficulty in meeting projected water demands during normal, single-dry, or multiple-dry water years.

Projected City of Tracy water sources during normal water years include Delta Mendota Canal/Central Valley Project (DMC/CVP), South County Water Supply Project (SCWSP), Byron-Bethany Irrigation District (BBID) and groundwater, and anticipate future supplies through additional allocations from CVP and SCWSP. During single dry years, the City anticipates the same water sources as during normal water years with additional groundwater supplies and water from aquifer storage and recovery. The City has acquired semitropic storage, however due to difficulties in accessing water via the DMC, the City has assumed that no semitropic water will be available in single dry years. Although no semitropic water would be available in the first year of a multiple dry year period, 100 percent would be available in the second and third year.

A summary of the City of Tracy's projected water supply and demand are summarized in Table 1. The City is expected to have adequate water supplies during normal years to meet its projected demands through 2040. In normal years at Buildout, the City's total annual water demand is estimated to exceed total water supply, resulting in a projected total water supply shortfall of 7 percent (data not shown). Projected water supplies up to water year 2040 will be sufficient to meet projected demands. However, beginning in 2040, it is projected that during single dry years, water supplies will be insufficient to meet total projected demands. The total water supply shortfall in 2040 is 6 percent, and projected to increase to 31 percent at Buildout. Similarly, in 2040, it is projected that during multiple dry years, water supplies will be insufficient to meet total projected demands. During the first year of a multiple dry year period in 2040, a shortfall of 0.2 percent in supply would occur. However, no shortfalls are anticipated in the second or third years of multiple dry year periods in 2040 until Buildout. At Buildout, first year shortfalls are projected to increase by 27 percent and 17 percent during the second and third years for multiple dry year periods. During dry years, the City expects to meet shortfalls through implementation of its Water Shortage Contingency Plan. The Plan systematically identifies ways in which the City can reduce water demands and augment supplies during dry years. The Plan was updated in June 2015 to include mandatory prohibitions required by the State Water Board and provide the City with additional tools to meet the Water Boards mandated 28% conservation standard. Guiding principles of the plan include prioritizing the reduction of non-essential water uses, water cutbacks on outdoor water use, and fewer enforceable requirements (EKI 2016).

Table 1 Comparison of Regional Water Agency Projected Water Supply and Demand

Water Agency	Water Year Type	Supply, AF	Demand, AF
Zone 7[1]	**Normal Dry Year**	99,500	92,600
	Single Dry Year	78,200	49,900
	Multiple Dry Year[2]	73,950	58,600
City of Tracy[3]	**Normal Dry Year**	34,830	27, 537
	Single Dry Year	25,980	27,537
	Multiple Dry Year[2]	30,980	27,537

[1] Projected water supply and demand in 2035
[2] Data shown for third year of drought
[3] Projected water supply and demand in 2040

Sources: Zone 7 Water Agency. 2015 Urban Water Management Plan. March 31; Erler & Kalinowski, Inc. 2016. 2015 Urban Water Management Plan for the City of Tracy. July

6.2 Dry Year Water Demand

Section 10631 of the Water Code requires that water demands be estimated for an average water year, a single dry water year and multiple dry water years. As discussed in the City's 2015 Urban Water Management Plan, the Zone 7 service area has a Mediterranean climate, with cool, moist winters and hot, dry summers. Rain typically occurs in November through April, with generally lower rainfall amounts in the portion of the service area. Evapotranspiration (ETo) greatly exceeds annual rainfall, with average annual precipitation of approximately 16 inches and total ETo of approximately 52 inches of water (Zone 7 Water Agency 2016). Even during dry years the indoor demands for the Project can be expected to remain constant.

7.0 Conclusion

Based on the information in this assessment, the temporary construction-related demand for water could be readily supplied by either Zone 7 or the City of Tracy Water District without putting undue strain on either agency's supply. The Zone 7 Water Agency has sufficient existing water supply to fully support the Project under normal, single dry, or multiple dry water years. City of Tracy water supplies will be sufficient to meet water demand under normal, single dry, or multiple dry water years when the project would be constructed.. Because of the scarcity of wells in the project vicinity, their distance from the proposed O&M building's location and the small amount of water required to support four onsite personnel, the operational water demand is likely to be served by an onsite well. If the groundwater proves to be nonpotable, drinking water would be imported to serve operational personnel.

8.0 References

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