

Final Environmental Analysis

For the Proposed

Zero-Emission Airport Shuttle Regulation and Zero-Emission Powertrain Certification Regulation

California Air Resources Board

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Sacramento, California, 95814

Date of Release: June 24, 2019

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ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
BEB	Battery Electric Bus
CARB or Board	California Air Resources Board
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CO ₂	Carbon Dioxide
EA	Environmental Analysis
EIR	Environmental Impact Report
FCEB	Fuel Cell Electric Bus
GHG	Greenhouse Gas
GVWR	Gross Vehicle Weight Rating
ISOR	Staff Report: Initial Statement of Reasons
LCFS	Low Carbon Fuel Standard
MMT CO ₂ e	Million Metric Tons of Carbon Dioxide Equivalent
NEPA	National Environmental Policy Act
NO _x	Oxides of Nitrogen
NO ₂	Nitrogen Dioxide
PM	Particulate Matter
PM ₁₀	Respirable Particulate Matter (particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers)
PM _{2.5}	Fine Particulate Matter (particles with and aerodynamic diameter less than or equal to a nominal 2.5 micrometers)
PRC	Public Resources Code
RD	Renewable Diesel
RNG	Renewable Natural Gas

SB	Senate Bill
SCAQMD	South Coast Air Quality Management District
SIP	State Implementation Plan
TAC	Toxic Air Contaminant
U.S. EPA	U.S. Environmental Protection Agency
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound
ZE	Zero-Emission
ZEAS	Zero-Emission Airport Shuttle
ZEV	Zero-Emission Vehicle

PREFACE

The California Air Resources Board (CARB or Board) released a Draft Environmental Analysis (Draft EA) for the Proposed Zero-Emission Airport Shuttle (~~ZEAS~~) Regulation and the Proposed Zero-Emission Powertrain Certification Regulation (collectively referred to as the Proposed Project) on January 4, 2019, for a 45-day public review and comment period that concluded February 19, 2019. During the public comment period for the Proposed Project, a total of 24 comment letters were submitted electronically on or before February 19, 2019, to the comment dockets set up for the Proposed Project and its appendices, including the Draft EA. Four additional comment letters were received late after the close of the docket and five comment letters were received during the Board Hearing on February 22, 2019. During the 15 Day Comment Period 13 comment letters were received. Out of the 46 total comments letters received, four comment letters were determined to include comments raising significant environmental issues related to the Draft EA and requiring a written response under CARB's certified regulatory program and the California Environmental Quality Act (CEQA).

CARB staff made minor modifications to the Draft EA to create the Final EA. To facilitate identifying modifications to the document, modified text is presented in the Final EA with ~~strike-through~~ for deletions and underline for additions. None of the modifications alter any of the types of foreseeable compliance responses evaluated or conclusions reached in the Draft EA, introduce new significant effects on the environment, or provide new information of substantial importance relative to the EA. As a result, these revisions do not require recirculation of the document pursuant to the CEQA Guidelines, California Code of Regulations, title 14, Section 15088.5, before consideration by the Board.

1.0 INTRODUCTION AND BACKGROUND

A. Introduction

This ~~Draft~~Final Environmental Analysis (~~Draft~~Final EA) is a program environmental document prepared to cover the Proposed Zero-Emission Airport Shuttle (ZEAS) Regulation and the Proposed Zero-Emission Powertrain Certification Regulation (collectively referred to as the Proposed Project). ~~This Draft EA is Appendix B in to both staff reports that will be presented to the California Air Resources Board (CARB or Board) for consideration.~~ The Project Description section of this ~~Draft~~Final EA presents a summary of the Proposed Project, as defined under the California Environmental Quality Act (CEQA). A detailed description of the Proposed Project is included in the Staff Report: Initial Statement of Reasons for the “Proposed Zero-Emission Airport Shuttle Regulation,” and the Staff Report: Initial Statement of Reasons for the “Proposed Alternative Certification Requirements and Test Procedures for Heavy-Duty Electric and Fuel-Cell Vehicles and Proposed Standards and Test Procedures for Zero-Emission Powertrains (ZEP Cert),” date of release December 4, 2018, which are hereby incorporated by reference.

This ~~Draft~~Final EA is intended to disclose potential adverse impacts of the Proposed Project and identify potential mitigation measures if significant environmental impacts are identified. The Proposed Project is intended to create environmental benefits related to greenhouse gas (GHG) reductions and air quality improvements. However, in some cases, as described in Chapter 4 of this ~~Draft~~Final EA, potentially significant effects to environmental resources may occur due to implementation of compliance responses associated with the Proposed Project. It is expected that many of these potentially significant impacts can be feasibly avoided or mitigated to a less-than-significant level, as described in each resource area, due to project-specific environmental review processes associated with compliance responses and compliance with local and state laws and regulations. The ~~Draft~~Final EA takes the conservative approach in its post-mitigation significance conclusions (i.e., tending to overstate the risk that feasible mitigation may not be sufficient to mitigate an impact to less than significant or may not be implemented by other parties) and discloses, for CEQA compliance purposes, that potentially significant environmental impacts may be unavoidable.

B. Background Information on the Proposed Project

1. Proposed Zero-Emission Airport Shuttle Regulation

Mobile sources and their fuels contribute to over 80 percent of the smog-forming NO_x emissions in South Coast Air Basin and nearly 50 percent of statewide GHG emissions.¹ Major portions of California are in nonattainment with the federal Ozone 8-

1 Mobile Source Strategy available at: <https://www.arb.ca.gov/planning/sip/2016sip/2016mobsrc.pdf>

Hour standards, including population-rich centers such as the South Coast Air Basin, San Diego Air Basin, San Francisco Bay Air Basin, and parts of the Sacramento Valley Air Basin. These population-rich areas also include commercial airports. In a multifaceted effort to attain air quality standards, reduce health risks to individuals living in California, and meet climate change goals, large NO_x and GHG emission reductions are needed from the transportation sector, including shuttle buses that serve California's commercial airports.

The California Revised Proposed 2016 SIP² included several on-road heavy-duty strategies, including the Zero-Emission Airport Shuttle Bus measure, that will help achieve the necessary emission reductions of NO_x, PM, TACs, and GHGs, while simultaneously increasing the magnitude of the first wave of ZEV deployment. Additionally, the experience gained from demonstrating the viability of zero-emission operations will benefit other heavy-duty on-road markets and enable cleaner transportation in other source categories. These on-road strategies will also help achieve a 50 percent reduction in petroleum use in vehicles that is needed to achieve a GHG reduction to 40 percent below 1990 levels by 2030³.

Specifically, CARB's Medium- and Heavy- Duty Battery Electric Trucks and Buses Technology Assessments⁴ identified airport shuttles as readily suited for battery electric operation because of the well-defined routes, with the added benefit of less maintenance. Although internal combustion engines have improved and optional low-NO_x or near-zero emission vehicles are available, growth in California vehicle activity has resulted in increased emissions and increased dependence on petroleum fuels in the transportation sector. Transportation sector deployment of ZEV technologies in well suited applications, such as airport shuttles, will offset emissions and promote transportation sector energy diversity.

Through this rulemaking, staff is proposing to require ZEV operation by private and public airport shuttle fleet owners that service the 13 largest California airports to provide criteria pollutant, greenhouse gas and other harmful exhaust emission reductions. The proposal has three major components:

1. Annual electronic reporting requirement, starting in 2022
 - Beginning January 1, 2022, airport shuttle fleet owners must electronically report fleet information to CARB no later than March 1, 2022 and maintain records for at least 36 months from the date of submission to CARB
2. Zero-Emission Certification requirements

2 Revised Proposed 2016 State Strategies for the State Implementation Plan available at <https://www.arb.ca.gov/planning/sip/2016sip/rev2016statesip.pdf>

3 Senate Bill 32 codification of 2030 GHG targets. http://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB350

4 Same footnote as 1: https://www.arb.ca.gov/msprog/tech/techreport/bev_tech_report.pdf

- For 2026 model year and subsequent model years, heavy-duty zero-emission airport shuttles will be required to be certified to the proposed Enhanced Zero-Emission Powertrain Certification requirements to be compliant with this regulation
3. In-Use Fleet composition requirement with three compliance deadlines:
- At least 33 percent of the fleet must be ZEASs zero-emission airport shuttles by December 31, 2027;
 - At least 66 percent of the fleet must be ZEASs zero-emission airport shuttles by December 31, 2031; and
 - 100 percent of the fleet must be zero-emission airport shuttles by December 31, 2035

The proposed compliance benchmarks are designed to provide flexibility throughout the transition period, especially in earlier years, in acknowledgement of comments received regarding access to publicly available incentive funding opportunities and to use existing vehicles for their full useful life. The phase-in approach allows for continued use of funding and the proposal includes a no-backsliding provision to ensure continued progress as well as exemptions and extensions in order to ease the complete transformation to ZEASs zero-emission airport shuttles. A description of the ZEAS Zero-Emission Airport Shuttle Regulation is available in Chapters I and X of the ISOR.

2. Proposed Zero-Emission Powertrain Certification Regulation

The South Coast and San Joaquin Valley air basins are the only two areas in the nation in extreme nonattainment of the national ambient air quality standard for ozone. Meeting the federal ozone standard will require both the South Coast and San Joaquin Valley to reduce their oxides of nitrogen (NO_x) emissions by around 80 percent from 2010 levels by 2023 and by almost 90 percent by 2032, and will also necessitate significant NO_x reductions in other California regions. In addition, California Executive Order S-3-05 sets a greenhouse gas emission reduction target of 80 percent below 2010 levels by 2050. To meet these multiple long-term air quality and climate goals, California must accelerate development and deployment of the cleanest feasible technologies for all vehicle and equipment sectors, with broad deployment of zero- and near zero-emission cars, trucks, and buses.

California has employed a suite of strategies to significantly reduce mobile source emissions over the years, including: progressively lower new engine and vehicle emission standards; certification, on-board diagnostics, Smog Check and other requirements to ensure emissions remain low in-use; fleet rules and financial incentives to clean up the existing legacy fleet; zero-emission requirements for passenger vehicles; and, most recently, incentive funding to accelerate demonstration and deployment of the next generation of advanced vehicle and equipment technologies. To build upon these strategies, CARB staff is currently developing proposals for a number of new regulatory measures that would increase deployments of zero-emission technologies. To support the potential future zero-emission technology measures

targeting heavy-duty trucks and buses, as well as existing incentive programs for such vehicles, CARB staff is proposing an optional certification pathway that would help reduce variability in the quality and reliability of heavy-duty zero-emission technology, ensure information regarding heavy-duty electric and fuel-cell vehicles (and their powertrains) are effectively and consistently communicated to purchasers, and accelerate progress towards greater vehicle reparability with the goal of helping ensure that zero-emission technologies are capable of meeting the reliability and performance expectations of California fleets and bolstering the momentum of the advanced technology industry. Staff believes reliable and well-supported zero-emission technologies, as well as greater market transparency and consistency, are essential for these technologies to achieve a market foothold in the aforementioned target segments.

Specifically, the Zero-Emission Powertrain Certification Regulation (ZEP Cert) could be used to meet the following policy objectives:

- Support Robust Regulatory Development: ZEP Cert is needed to support existing and potential future technology-advancing measures, such as the Zero-Emission Airport Shuttle regulations, by ensuring required zero-emission truck and bus technologies are reliable and well-supported in-use.
- Support Effective Funding Program Implementation: ZEP Cert would enable CARB to ensure zero-emission truck and bus technologies meet defined certification criteria to be eligible for CARB incentive programs.
- Empower Fleet Decision Making: ZEP Cert would help fleets make more-informed purchasing decisions by making key serviceability, warranty, and performance information available to purchasers.

C. Environmental Review Process

1. Requirements under the California Air Resources Board Certified Regulatory Program

CARB is the lead agency for the Proposed Project and has prepared this ~~Draft~~Final EA pursuant to its CEQA certified regulatory program. Public Resources Code (PRC) Section 21080.5 allows public agencies with regulatory programs to prepare a “functionally equivalent” or substitute document in lieu of an Environmental Impact Report (EIR) or Negative Declaration, once the program has been certified by the Secretary for Resources Agency as meeting the requirements of CEQA. CARB’s regulatory program was certified by the Secretary of the Resources Agency in 1978 (14 California Code of Regulations (CCR), title 14, Section 15251(d)). As required by CARB’s certified regulatory program, and the policy and substantive requirements of CEQA, CARB prepared this ~~Draft~~Final EA to assess the potential for significant adverse and beneficial environmental impacts associated with the Proposed Project and to provide a succinct analysis of those impacts (17 CCR Section 60005(a), (b)). The resource areas from the CEQA Guidelines (14 CCR Section 15000 et. seq.)

Environmental Checklist (Appendix G of that document) were used as a framework for assessing potentially significant impacts.

CARB has determined that approval of the Proposed Project is a “project” as defined by CEQA. CEQA defines a project as “the whole of an action, which has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment, and that is an activity directly undertaken by any public agency” (14 CCR Section 15378(a)). Although the policy aspects of the Proposed Project do not directly change the physical environment, indirect physical changes to the environment could result from reasonably foreseeable compliance responses taken in response to implementation actions identified in the Proposed Project. In addition, some of the construction activities undertaken to comply with this Proposed Project may also be part of California electric utilities projects mandated by SB 350 (CPUC, 2017).

As required by CEQA, this ~~Draft~~Final EA contains “an environmental analysis of the reasonably foreseeable methods by which compliance with that rule or regulation will be achieved (14 CCR Section 15187).” The analysis shall include reasonably foreseeable environmental impacts of the methods of compliance, reasonably foreseeable feasible mitigation measures related to significant impacts, and reasonably foreseeable alternative means of compliance that would avoid or eliminate significant impacts.

Compliance responses are activities undertaken by regulated communities to comply with regulations. Compliance activities would change in response to regulatory amendments included under the Proposed Project. This ~~Draft~~Final EA presents a programmatic evaluation that describes reasonably foreseeable environmental impacts resulting from the change in compliance responses by regulated communities. The analysis considers reasonable, potential compliance responses, but does not speculate as to all the conceivable iterations of compliance responses that could occur within the vehicle fleet or at the site or project-specific level.

It is not possible to know with a reasonable level of certainty the specific actions that would be selected by regulated communities to comply with the regulatory changes under the Proposed Project. Depending on the specific characteristics and needs of a community, Proposed Project related compliance responses may differ as compared to those evaluated in this ~~Draft~~Final EA. Compliance responses may involve an entity that is not a regulated entity. For example, individual manufacturers or major refiners for hydrogen and renewable fuels could choose other compliance responses that result in different project impacts. Such entities, in addition to local communities, would be required to undergo project-level environmental review, which could conclude more adverse or less substantial environmental effects as those contained in this ~~Draft~~Final EA. For the purposes of this ~~Draft~~Final EA, the least expensive compliance responses are generally expected to be implemented by covered industries, although the responses of individual regulated communities within affected industries may differ depending on relative compliance costs and other factors.

2. Scope of Analysis and Assumptions

The degree of specificity required in a CEQA document corresponds to the degree of specificity inherent in the underlying activity it evaluates. For example, the assessment of a construction project would be naturally more detailed than one concerning the adoption of a local general plan because construction related effects can be predicted with more accuracy (14 CCR Section 15146(a)). Since this analysis addresses a state-wide program, a general level of detail is appropriate. However, this ~~Draft~~Final EA makes a rigorous effort to evaluate significant adverse impacts and beneficial impacts of the reasonably foreseeable compliance responses that could result from implementation of the Proposed Project and contains as much information about those impacts as is currently available, without being unduly speculative. The scope of analysis in this ~~Draft~~Final EA is intended to help focus public review and comments on the Proposed Project and ultimately to inform the Board of the environmental benefits and adverse impacts of the proposal.

The analysis of potentially significant adverse environmental impacts of the Proposed Project is based on the following assumptions:

1. This analysis addresses the potentially significant adverse environmental impacts resulting from implementing the Proposed Project compared to existing conditions (see Chapter 2, "Project Description").
2. The analysis of environmental impacts and determinations of significance are based on reasonably foreseeable compliance responses taken in response to implementation of the Proposed Project.
3. The analysis in this ~~Draft~~Final EA addresses environmental impacts both within California and outside the State to the extent they are reasonably foreseeable and do not require speculation.
4. The level of detail of impact analysis is necessarily and appropriately general because the Proposed Project is programmatic. While the general locations of fleets covered under the Proposed Project are known within California, decisions by the regulated entities regarding compliance options are unknown. Furthermore, attempting to predict decisions by entities regarding the specific location and design of infrastructure undertaken in response to implementation of the Proposed Project would be speculative at this stage due to the influence of other business and market considerations in those decisions. As a result, there is some inherent uncertainty in the degree of mitigation that would ultimately need to be implemented to reduce any potentially significant impacts identified in this ~~Draft~~Final EA. Consequently, this ~~Draft~~Final EA takes the conservative approach in its post-mitigation significance conclusions (i.e., tending to overstate the risk that feasible mitigation may not be implemented by the agency with authority to do so, or may not be sufficient to mitigate an impact to less than significant) and discloses, for CEQA compliance purposes, that potentially significant

environmental impacts may be unavoidable, where appropriate. It is also possible that the amount of mitigation necessary to reduce environmental impacts to below a significant level may be less than disclosed in this ~~Draft~~Final EA for any specific compliance response. Specific actions undertaken to implement the Proposed Project would undergo project-level environmental review as required and compliance processes at the time they are proposed. It is expected that potentially significant impacts of many individual development projects would be avoidable or mitigable to less than significant.

5. This ~~Draft~~Final EA generally does not analyze site-specific impacts when the location of future facilities or other infrastructure changes are speculative. However, the ~~Draft~~Final EA does examine regional (e.g., air district and/or air basin) and local issues to the degree feasible where appropriate. As a result, the impact conclusions in the resource-oriented sections of Chapter 4, Impact Analysis and Mitigation Measures, cover broad types of impacts, considering the potential effects of the full range of reasonably foreseeable actions undertaken in response to the Proposed Project.

D. Organization of the ~~Draft~~Final EA

The ~~Draft~~Final EA is organized into the following chapters:

- **Chapter 1, Introduction and Background**, provides a project overview and background information, and other introductory material.
- **Chapter 2, Project Description**, summarizes the Proposed Project, the potential reasonably foreseeable compliance responses taken in response to the Proposed Project, and implementation assumptions.
- **Chapter 3, Environmental and Regulatory Setting**, contains the environmental and regulatory setting relevant to the environmental analysis of the Proposed Project.
- **Chapter 4, Impact Analysis and Mitigation**, identifies the potential environmental impacts associated with the ZEASZero-Emission Airport Shuttle Regulation and mitigation measures for each resource impact area.
- **Chapter 5, Cumulative and Growth-Inducing Impacts**, analyzes the potential for cumulative effects of implementing the ZEASZero-Emission Airport Shuttle Regulation against a backdrop of past, present, and reasonably foreseeable future projects.
- **Chapter 6, Mandatory Findings of Significance**, discusses the potential for adverse impacts on human beings, cumulatively considerable environmental impacts, and whether the ZEASZero-Emission Airport Shuttle Regulation would have the potential to degrade the quality of the environment.

- **Chapter 7, Alternatives Analysis**, discusses a reasonable range of potentially feasible alternatives that could reduce or eliminate adverse environmental impacts associated with the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation.
- **Chapter 8, References**, identifies sources of information used in this ~~Draft~~Final EA.

E. Public Review Process for the Environmental Analysis

At a public workgroup meeting held on June 30, 2017, CARB staff solicited feedback on regulatory concepts for the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation. At a public workgroup meeting on December 4, 2017, CARB staff presented information gathered during the regulatory development process including survey results, incentives, cost numbers, outreach efforts, environmental analysis, the proposed regulatory compliance schedule and provided additional details on the development of regulatory structure. At this workgroup meeting, CARB staff presented information regarding the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation's CEQA review process and invited public feedback on the scope of analysis.

In January 2018, CARB held a public workgroup meeting to discuss zero-emission shuttle bus infrastructure, including: managing demand charges, site specific construction charges, utility upgrades, cost-sharing opportunities, and incentive programs. In March 2018, CARB held two public workshop meetings to present and solicit feedback on draft language for the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation and discuss strategies to expand the use of ~~ZEAS~~zero-emission airport shuttles at airports. The public has not voiced any comments on the planned scope of the CEQA review process during these meetings or submitted any written comments.

CARB held public workshops for ZEP Cert on November 29, 2017, February 13, 2018, March 20, 2018, and July 25, 2018. At these workshops, CARB staff solicited the public's feedback on the draft regulatory proposal.

In accordance with CARB's certified regulatory program, and consistent with CARB's commitment to public review and input, this Draft EA ~~is~~was subject to a public review process through the posting of the Proposed Project document. Written comments on the Draft EA ~~will be~~were accepted ~~starting from~~ January 4, 2019, through 5:00 p.m. on February 19, 2019. The Board will consider the Final EA and responses to comments received on the Draft EA before considering adoption of the Proposed Project.

2.0 PROJECT DESCRIPTION

A. Objectives

Recognizing the requirements of Assembly Bill (AB) 32 to reduce GHG emissions, the need for California to attain the national and state ambient air quality standards for criteria air pollutants and to reduce exposure to toxic air contaminants (TACs), the primary objectives of the Proposed Project include the following:

1. Achieve the maximum emissions reduction possible from airport shuttles to attain the national ambient air quality standards for criteria air pollutants (Health & Safety Code Sections 43000.5(b), 43018(a)).
2. Accelerate the replacement of internal combustion powered airport shuttles with equivalent zero-tailpipe emission vehicles (Health & Safety Code Sections 40000, 43013).
3. Reduce the State's dependence on petroleum as an energy resource and support the use of diversified fuels in the State's transportation fleet (Health & Safety Code Section 43000(e), California Public Resources Code (PRC) Section 25000.5). In addition, petroleum use as an energy resource contributes substantially to the following public health and environmental problems: air pollution, acid rain, global warming, and the degradation of California's marine environment and fisheries (PRC Section 25000.5(b), (c)).
4. Decrease GHG emissions in support of statewide GHG reduction goals by adopting a "Zero-Emission Airport Shuttle program," as directed by AB 32. The 2016 Mobile Source Strategy aim to accelerate development and deployment of the cleanest feasible mobile source technologies and to improve access to clean transportation. Implementation of the Proposed Project would also provide further GHG reductions pursuant to AB 1493 (Ch. 200, Stats. of 2002, Pavley).
5. Develop a regulation that is consistent with and meets the goals of the State Implementation Plan (SIP), providing necessary emission reductions for all of California's nonattainment areas to meet federal ambient air quality standards (Health & Safety Code Sections 39002, 39003, 39602.5, 43018, 43000, 43000.5, 43013, 43018).
6. Maintain and continue reductions in emissions of GHGs beyond 2020, in accordance with AB 32 (Health & Safety Code Sections 38551(b), 38562, 38562.5, 38566); pursue measures that implement reduction strategies covering the State's GHG emissions in furtherance of California's mandate to reduce GHG emissions to the 1990 level by 2020 and 40 percent below the 1990 level by December 31, 2030.
7. Aid the transition of California's heavy-duty transportation sector from

combustion to zero-emission powertrains.

8. Complement existing programs and plans to ensure, to the extent feasible, that activities undertaken pursuant to the measures complement, and do not interfere with, existing planning efforts to reduce GHG emissions, criteria pollutants, petroleum-based transportation fuels, and TAC emissions.
9. Incentivize and support emerging ZEV technology that will be needed to achieve CARB's SIP goals.
10. Achieve emission reductions that are real, permanent, quantifiable, verifiable, and enforceable (Health & Safety Code Sections 38560, 38562(d)(1)).
11. Encourage public and private airport shuttle fleets to utilize incentive grants and cost sharing opportunities through Senate Bill (SB) 350 to off-set the capital vehicle and infrastructure investments.
12. Ensure all Californians can live, work, and play in a healthful environment free from harmful exposure to air pollution. Protect and preserve public health and well-being, and prevent irritation to the senses, interference with visibility, and damage to vegetation and property (Health & Safety Code Section 43000(b)) in recognition that the emission of air pollutants from motor vehicles is the primary cause of air pollution in many parts of the State (Health & Safety Code Section 43000(a)).
13. Spur economic activity. Incentivize innovation that will transition California's economy into greater use of clean and sustainable technologies and promote increased economic and employment benefits that will accompany this transition (AB 1493, Section 1(g); Health & Safety Code Section 38501(e)).
14. The objective of the ZEP Cert proposal is to support existing and future CARB zero-emission programs by encouraging the development of robust heavy-duty electric and fuel cell vehicles, ensuring a minimum level of in-use support for zero-emission technology, and supporting the overall transition of the technology into the heavy-duty vehicle segment.

B. Description of Proposed Project and Reasonably Foreseeable Compliance Responses

1. Zero-Emission Airport Shuttle Regulation

The ~~ZEAS~~Zero-Emission Airport Shuttle Regulation is focused on achieving emission reductions and transforming heavy-duty fleets that service airports from in-use internal combustion powered airport shuttles to ~~ZEAS~~zero-emission airport shuttles. The Proposed ~~ZEAS~~Zero-Emission Airport Shuttle Regulation would apply to airport shuttles weighing 8,501 pounds GVWR and over, including, but not limited to, vans, cutaways, and transit style buses. The Proposed ~~ZEAS~~Zero-Emission Airport Shuttle Regulation

only applies to airport shuttles with fixed destination routes to and around the airport. This includes airport shuttles owned or operated by public entities and private companies. These fixed destination routes serviced by airport shuttles have ideal operational characteristics for deploying zero-emission heavy-duty vehicles, including low-mileage routes, and low average speeds with multiple stops to load and unload passengers. They also have centrally located maintenance and fueling sites.⁵ A fleet may contain one or more airport shuttles that are owned, leased, or operated by the same business or an airport entity. The goals of the Proposed ZEAS Zero-Emission Airport Shuttle Regulation are to transition existing in-use internal combustion powered airport shuttles to ZEASs zero-emission shuttles to protect the environment and public health.

a) Zero-Emission Shuttle Compliance Requirements

i. Summary

The ZEAS Zero-Emission Airport Shuttle proposal has three major components:

1. Annual electronic reporting requirement, starting in 2022
 - Beginning January 1, 2022, airport shuttle fleet owners must electronically report fleet information to CARB no later than March 1, 2022 and maintain records for at least 36 months from the date of submission to CARB
2. Zero-Emission Certification requirements
 - For 2026 model year and subsequent model years, heavy-duty zero-emission airport shuttles will be required to be certified to the proposed Enhanced Zero-Emission Powertrain Certification requirements to be compliant with this regulation
3. In-Use Fleet composition requirement with three compliance deadlines:
 - At least 33 percent of the fleet must be ZEASs zero-emission airport shuttles by December 31, 2027;
 - At least 66 percent of the fleet must be ZEASs zero-emission airport shuttles by December 31, 2031; and
 - 100 percent of the fleet must be zero-emission airport shuttles by December 31, 2035

The proposed compliance benchmarks are designed to provide flexibility throughout the transition period, especially in earlier years, in acknowledgement of comments received regarding access to publicly available incentive funding opportunities. The phase-in approach allows for continued use of funding and the proposal includes a no-backsliding provision to ensure continued progress as well as exemptions and

5 Draft Technology Assessment: Medium- and Heavy –Duty Battery Electric Trucks and Buses: https://www.arb.ca.gov/msprog/tech/techreport/bev_tech_report.pdf, October 2015, P. IV-14 of the CARB

extensions in order to ease the complete transformation to ZEAS zero-emission airport shuttles. In addition the ZEAS Zero-Emission Airport Shuttle Regulation Proposal requires on or after January 1, 2036, on or after January 1, 2036, no fleet owner shall operate an airport shuttle at a regulated airport unless that airport shuttle is a ZEAS zero-emission shuttle. A ZEAS zero-emission airport shuttle is an electric vehicle or fuel cell vehicle that is certified or approved for sale in California. The ZEAS Zero-Emission Airport Shuttle Regulation fleet compliance schedule that requires owners of airport shuttle fleets to have a certain percentage of ZEAS zero-emission airport shuttles in their fleets by the timeframe shown in Table 1.

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Table 1: Zero-Emission Airport Shuttle Fleet Compliance Schedule

Starting December 31	Percent of ZEAS Purchases Percent of Total Fleet That Must Be Zero-Emission Airport Shuttles
2027	33
2031	66
2035	100

In addition, the ZEAS Zero-Emission Airport Shuttle Regulation requires that after January 1, 2023, any ZEAS if a fleet owner is replacing a zero-emission airport shuttle in a fleet it must be replaced with a ZEAS zero-emission airport shuttle in order to commit to the successful operation of ZEAS zero-emission technologies and to ensure criteria pollutant, greenhouse gas emission reductions are maintained.

ii. Compliance Responses

Reasonably foreseeable compliance responses under this measure would include an increase in manufacturing and associated facilities to increase the supply of zero-emission airport shuttles (ZEAS), along with construction of new hydrogen fueling stations and battery electric bus (BEB) charging stations to support ZEAS zero-emission airport shuttle operations. Increased deployment of zero-emission airport shuttles could increase production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from sources countries or other states. Increased demand for lithium-ion batteries could increase production and manufacture, which could result in the expansion of or construction of new facilities along with associated increases in lithium mining and exports from source countries or other states. Disposal of any portion of vehicles, including batteries, would be subject to and have to comply with existing laws and regulations governing solid and hazardous waste, such as California's Hazardous Waste Control law, and implementing regulations, such as the Universal Waste Rule (22 California Code of Regulations (CCR) Chapter 23). That is, disposal of used batteries into solid waste landfills is prohibited; however, they could be refurbished, re-

used or disposed of as hazardous waste. To meet an increased demand of refurbishing or reusing batteries, new facilities or modifications to existing facilities are anticipated to accommodate battery recycling activities. Fleet turnover would be largely unaffected because the proposed purchase requirement applies at time of normal purchase and would not require any accelerated purchases.

b) Mandatory Reporting Requirements

i. Summary

CARB staff is proposing to establish annual mandatory reporting requirements for airport shuttle fleet owners on airport shuttles including ~~ZEAS~~zero-emission airport shuttles.

ii. Compliance Responses

This requirement is administrative in nature and would not result in any changes to the physical environment and is not evaluated further in the ~~Draft~~Final EA.

c) Enforcement Provision

i. Summary

CARB staff is proposing to include record keeping requirements and enforcement provisions to ensure compliance with fleet and reporting requirements.

ii. Compliance Responses

This requirement is administrative in nature and would not result in any changes to the physical environment and is not evaluated further in the ~~Draft~~Final EA.

2. Zero-Emission Powertrain Certification Regulation

The proposed Zero-Emission Powertrain and Vehicle Certification Regulation (ZEP Cert) is an optional certification pathway that includes requirements to help reduce variability in the quality and reliability of heavy-duty zero-emission technology, ensure information regarding heavy-duty electric and fuel-cell vehicles (and their powertrains) is effectively and consistently communicated to purchasers, and accelerate progress towards greater vehicle repairability. Specifically, the proposed alternate certification pathway would require a manufacturer to:

- Use a simple, defined test procedure developed by the automotive industry to determine battery-capacity;
- Provide a modest 3-year, 50,000-mile warranty that covers workmanship and defects, and be subject to recall provisions;
- Make certain diagnostic information readable through a common automotive scan tool;
- Make service-and-repair manuals and proprietary service tools available to third-party repair facilities at a reasonable cost; and

- Make available to the consumer specific information about its zero-emission technology so that the consumer can make an informed choice when selecting a vehicle for purchase.

ZEPCert could be used to meet several policy objectives. The first would be to support robust regulatory and incentive program development. Existing and potential future technology-advancing measures, such as the Zero-Emission Airport Shuttle regulations as well as CARB incentive programs, may require ZEPCert, ensuring that zero-emission truck and bus technologies that are part of those measures be subject to the associated warranty and serviceability requirements. Defined certification criteria would also enable CARB to more-effectively target funding to the most robust and innovative technologies. Lastly, ZEPCert would empower fleet decision making. ZEPCert would help reduce the perceived risk attributed to zero-emission technology by making key serviceability and warranty, and performance information available to purchasers.

a) Zero-Emission Powertrain Certification

i. Summary

ZEPCert would set forth procedures that help ensure zero-emission technologies can meet the reliability and performance expectations of California fleets in order to help bolster the momentum of the advanced technology industry. ZEPCert would include requirements for warranty, service and repair, and testing. Staff believes robust, reliable, proven, and well-integrated zero-emission technologies are essential for these technologies to achieve a market foothold in the target segments.

ii. Compliance Responses

The warranty and service requirements will help expand the capabilities of the current service and repair network. However, they will not result in increase in construction of new facilities. The testing requirements of this proposal are functionally similar to tests that are common industry practice and would not require modifications to existing test facilities. Therefore reasonably foreseeable compliance responses associated with this proposed regulation would result in no adverse impacts to any of the environmental resource areas analyzed in Chapter 4 of this ~~Draft~~Final EA. As such this portion of the Proposed Project is not analyzed further in this ~~Draft~~Final EA.

C. Summary of Compliance Responses

Implementation of the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of zero-emission airport shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support zero-emission airport shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of zero-emission airport shuttles could results in a relatively small increase production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and

hydrogen fuel cells; however, disposal would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new facilities or modifications to existing facilities could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is implemented at the time of normal shuttle purchase.

As stated above the compliance responses associated with ZEP Cert would result in no adverse impacts to any of the environmental resource areas and therefore will not be analyzed further in this document.

3.0 ENVIRONMENTAL SETTING

The California Environmental Quality Act (CEQA) Guidelines require an Environmental Impact Report (EIR) to include an environmental setting section, which discusses the current environmental conditions near the project. This environmental setting constitutes the baseline physical conditions by which an impact is determined to be significant (CEQA Guidelines Section 15125). As discussed in Chapter 1 of this Appendix, CARB has a certified regulatory program and prepares an EA in lieu of an EIR. This ~~Draft~~Final EA is a functional equivalent to an EIR under CEQA. Therefore, in an effort to comply with the policy objectives of CEQA, an environmental setting, as well as a regulatory setting with relevant environmental laws and regulations, has been included as Attachment A to this document.

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4.0 IMPACT ANALYSIS AND MITIGATION MEASURES

A. Basis for Environmental Impact Analysis and Significance Determinations

This chapter contains an analysis of environmental impacts and mitigation measures that could result from the zero-emission airport shuttle Regulation. CEQA requires the baseline for determining the significance of environmental impacts to the existing conditions at the time the environmental review is initiated (14 California Code of Regulations (CCR) Section 15125 (a)). Therefore, significance determinations reflected in this ~~Draft~~Final EA are based on a comparison of the potential environmental consequences of the zero-emission airport shuttle Regulation with the regulatory setting and physical conditions in 2018 (see Attachment A). To determine whether the zero-emission airport shuttle Regulation would have a potential effect on the environment, CARB evaluated the potential physical changes to the environment resulting from the reasonably foreseeable compliance responses described in further detail in Chapter 2 of this ~~Draft~~Final EA.

1. Adverse Environmental Impact

The analysis of adverse effects on the environment and significance determinations for those effects reflect the programmatic nature of the analysis of the reasonably foreseeable compliance responses of the regulated entities and the marketplace. These reasonably foreseeable compliance responses are described in detail in Chapter 2. The ~~Draft~~Final EA addresses broadly defined types of impacts or actions that may be taken by others in the future as a result of the zero-emission airport shuttle Regulation, recognizing that CARB does not have the ability to determine specific projects or locations, facility size and character, or site-specific environmental characteristics affected by any potential future facilities.

This ~~Draft~~Final EA takes a conservative approach and considers some environmental impacts as potentially significant because of the inherent uncertainties in the relationship between physical actions that are reasonably foreseeable under the zero-emission airport shuttle Regulation and environmentally sensitive resources or conditions that may be affected. This approach tends to overstate environmental impacts considering these uncertainties and is intended to satisfy the good-faith, full-disclosure intention of CEQA. If specific projects are proposed and subjected to project-level environmental review, it is expected that many of the impacts recognized as potentially significant in the ~~Draft~~Final EA that are not already mitigated or avoided with this proposed project, can later be avoided or reduced to a less-than-significant level. If a potentially significant environmental effect cannot be feasibly mitigated with certainty, this ~~Draft~~Final EA identifies the impact as significant and unavoidable. If the Board adopts the zero-emission airport shuttle Regulation with one or more significant and unavoidable environmental effect identified in this ~~Draft~~Final EA, the Board would adopt findings as part of the approval action for each significant impact in addition to a statement of overriding considerations (i.e., other benefits of the action including economic, legal,

social, technological are determined to outweigh and override its significant unavoidable effects).

2. Mitigation Measures

The ~~Draft~~Final EA contains a degree of uncertainty regarding implementation of mitigation for potentially significant impacts. While CARB is responsible for adopting the zero-emission airport shuttle Regulation, it does not have authority over all the potential infrastructure and development projects that could be carried out in response to the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation. Other agencies are responsible for the review and approval, including any required environmental analysis, of any facilities and infrastructure that are reasonably foreseeable, including any definition and adoption of feasible project-specific mitigation measures, and any monitoring of mitigation implementation. For example, local cities or counties must approve proposals to construct new facilities. Additionally, State and/or federal permits may be needed for specific environmental resource impacts, such as take of endangered species, filling of wetlands, and streambed alteration.

Because CARB cannot predict the location, design, or setting of specific projects that may result and does not have authority over implementation of specific infrastructure projects that may occur, the programmatic analysis in the ~~Draft~~Final EA does not allow for identification of the precise details of project-specific mitigation. As a result, there is inherent uncertainty in the degree of mitigation that would ultimately need to be implemented to reduce any potentially significant impacts identified in the ~~Draft~~Final EA. Consequently, this ~~Draft~~Final EA takes the conservative approach in its post-mitigation significance conclusions (i.e., tending to overstate the risk that feasible mitigation may not be sufficient to mitigate an impact to less than significant) and discloses, for CEQA compliance purposes, that potentially significant environmental impacts may be unavoidable, where appropriate. It is also possible that the amount of mitigation necessary to reduce environmental impacts to below a significant level may be far less than disclosed in this ~~Draft~~Final EA on a case-by-case basis. It is expected that many potentially significant impacts of facility and infrastructure projects would be avoidable or mitigable to a less-than-significant level as an outcome of their project-specific environmental review processes.

3. Beneficial Effects to the Environment

Where applicable, consistent with CARB's certified regulatory program requirements (17 CCR Section 60005 subd.(b)) this ~~Draft~~Final EA also acknowledges potential beneficial effects on the environment in each resource area that may result from implementation of the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation.

B. Impact Analysis and Mitigation Measures

The following discussion provides a programmatic analysis of the reasonably foreseeable compliance responses that could result from implementation of the

~~ZEAS~~Zero-Emission Airport Shuttle Regulation, which are described in Chapter 2 of this ~~Draft~~Final EA. The impact analysis is organized by environmental resource areas in accordance with the topics presented in the Environmental Checklist in Appendix G to the CEQA Guidelines. The reasonably foreseeable compliance responses associated with the proposed regulation are analyzed in a programmatic manner for several reasons: (1) any individual action or activity would be carried out under the same authorizing regulatory authority (i.e., the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation); (2) the reasonably foreseeable compliance responses would result in generally similar environmental effects that can be mitigated in similar ways (14 CCR Section 15168 subd. (a)(4)); and (3) while the types of foreseeable compliance responses can be reasonably predicted, the specific location, design, and setting of the potential actions cannot feasibly be known at this time. If a later activity would have environmental effects that are not examined within this ~~Draft~~Final EA, the public agency with authority over the later activity would be required to conduct additional environmental review as required by CEQA or other applicable statute.

The analysis is based on an illustrative reasonably foreseeable compliance response scenario that is based on a set of reasonable assumptions. While the compliance response scenario described for each impact is not the only conceivable one, it provides a credible basis for the EA conclusions that is consistent with available evidence. It also includes actions that could likely occur under a broad range of the potential scenarios because the specific location, extent, and design of potential new and/or modified facilities cannot be known at this time, the impact discussions reflect a conservative assessment to describe the type and magnitude of effects that may occur (i.e., in that the conclusions tend to overstate adverse effects). These impact discussions are followed by the types of mitigation measures that could be required to reduce potentially significant environmental impacts.

1. Aesthetics

Impact 1-1: Short-Term Construction-Related Effects to Aesthetics

Implementation of the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of zero-emission airport shuttles (~~ZEASs~~), along with construction of new hydrogen fueling stations and electric vehicle charging stations to support ~~ZEAS~~zero-emission airport shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of ~~ZEASs~~zero-emission shuttles could result in a relatively small increase in production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells; however, disposal would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new

facilities or modifications to existing facilities could be constructed to accommodate recycling activities.

There is uncertainty as to the exact locations of these new plants, stations, and modifications, especially in regard to new manufacturing plants for producing propulsion batteries and fuel cells and in relation to the location of viewers. Construction and modification of these facilities, though likely to occur in areas with consistent zoning where other similar facilities may already be under construction or modification, could introduce or increase the presence of artificial elements (e.g., heavy-duty equipment, removal of existing vegetation, grading) in areas with national, State, or county designated scenic vistas and/or scenic resources visible from State scenic highways. The visual impact of such development would depend on several variables, including sensitivity of viewers, size of facilities, viewer distance, and angle of view, visual absorption capacities, and the structure placement in the landscape. Although temporary, introduction of construction in a highly sensitive and natural area, for example, could substantially degrade the area's visual quality. Additionally, construction may require nighttime lighting for security or to accommodate nighttime work. In areas with minimal existing lighting, construction lighting may be a substantial new source of light.

Therefore, short-term construction-related aesthetic impacts associated with the ZEASZero-Emission Airport Shuttle Regulation could be potentially significant.

This impact could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 1-1

The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, and regulations, and policies that provide protection of aesthetic resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with discretionary local land use and/or permitting authority. New or modified facilities in California would qualify as a "project" under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices routinely required to avoid and/or minimize impacts to aesthetic resources include:

- Proponents of new or modified facilities constructed as a compliance response to the ZEASZero-Emission Airport Shuttle Regulation would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body shall certify that the environmental document was

prepared in compliance with applicable regulations and approve the project for development.

- Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project.
- The project proponent would color and finish the surfaces of all project structures and buildings visible to the public to ensure that they: (1) minimize visual intrusion and contrast by blending with the landscape; (2) minimize glare; and (3) comply with local design policies and ordinances. The project proponent would submit a surface treatment plan to the lead agency for review and approval.
- To the extent feasible, the sites selected for use as construction staging and laydown areas shall be areas that are already disturbed and/or are in locations of low visual sensitivity. Where possible, construction staging and laydown areas for equipment, personal vehicles, and material storage shall be sited to take advantage of natural screening opportunities provided by existing topography and vegetation.
- All construction areas shall be kept clean and tidy, including the revegetating and regarding disturbed soil, and storage shall be screened from view and/or are generally not visible to the general public.
- Siting projects and their associated elements next to prominent landscape features or in a setting for observation from national historic sites, national trails, and cultural resources shall be avoided to the greatest extent.
- The project proponent shall prepare and implement a construction lighting mitigation plan and submit the plan to the local jurisdiction for review. The plan shall describe the measures to be used to reduce the visibility of on-site construction lighting from neighboring properties.

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this ~~Draft~~Final EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant scenic and nighttime lighting impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this ~~Draft~~Final EA takes the conservative approach in its post-mitigation significance conclusion and discloses that short-term construction-related scenic and nighttime lighting effects resulting from reasonably foreseeable compliance responses to the ZEASZero-Emission Airport Shuttle Regulation would be **potentially significant and unavoidable**.

Impact 1-2: Long-Term Operational-Related Effects to Aesthetics

Implementation of the ZEASzero-emission airport shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of ZEASszero-emission airport shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support zero-emission airport shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of zero-emission airport shuttles could result in a relatively small increase in production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells; however, disposal would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new facilities or modifications to existing facilities could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is implemented at the time of normal bus purchase.

Development of new facilities for the manufacture of ZEASzero-emission shuttle-related equipment, fuels (i.e., hydrogen), and infrastructure would be expected to occur in areas appropriately zoned; however, such facilities could conceivably introduce or increase the presence of visible artificial elements (e.g., heavy-duty equipment, new or expanded buildings, electric charging and hydrogen fueling stations) in areas of scenic importance, such as visibility from State scenic highways. The visual impact of such development would depend on several variables, including the type and size of facilities, distance and angle of view, visual prominence, and placement in the landscape. In addition, facility operation may introduce substantial sources of glare, exhaust plumes, and nighttime lighting for safety and security purposes. These types of impacts could result in significant effects on aesthetic resources.

Increased deployment of ZEASszero-emission shuttles could reduce rates of oil and natural gas extraction. Gasoline and diesel fuel use refined from crude oil drilling would be displaced as the transportation system is electrified and incorporates hydrogen fuels. Further, use of compressed natural gas (CNG)-powered vehicles would be expected to decrease, which could affect rates of natural gas extraction (e.g., hydraulic fracturing (fracking)). The processes of oil and natural gas extraction has substantial aesthetic impacts associated with the use of heavy-duty equipment including drills and rigs, as well as the operation of facilities to refine crude oil and natural gas into usable fuels for automobiles. Transitioning the transportation sector to inclusion of ZEASszero-emission airport shuttles could reduce the potential for adverse aesthetic impacts related to oil and gas extraction.

Increased use of battery electric ZEASszero-emission shuttles and technology could increase the demand for lithium-ion batteries for ZEASs, resulting in increased demand for lithium. Worldwide, the majority (80 to 90 percent) of raw lithium is currently mined

and exported from Australia, Chile, Argentina, and Bolivia (U.S. Geological Survey (USGS), 2017a). Lithium is typically derived from hard rock mining practices or from brine extraction. Hard rock mining, which is typical in Australia and, at the timing of writing this ~~Draft~~Final EA, is not practiced within the U.S. or California, requires the use of heavy-duty equipment (e.g., crushers, rigs, loaders, cutting equipment, cranes) and could result in harmful visual changes to the natural environment such as hillside erosion, contamination of surface waters, artificial drainage patterns, subsidence, nighttime lighting, and deforestation. In contrast, brine extract, which occurs in Chile, Argentina, Bolivia, and the U.S., involves vertical pumping of brine, which evaporates to form brown and white cones of salt minerals. It is reasonably foreseeable that increased demand for lithium-ion batteries could cause additional lithium extraction resulting in these types of adverse visual effects in areas where hard rock mining (Australia) and brine extraction activities (Chile, Argentina, Bolivia, and U.S.) occur.

There is uncertainty as to the exact locations of these new and modified facilities and lithium mines. Operation of these facilities, though likely to occur in areas with appropriate zoning where other similar facilities may already exist, could introduce or increase the presence of non-natural appearing elements (e.g., buildings, parking lots, mining equipment) in areas with national, State, or county designated scenic vistas and/or scenic resources visible from State scenic highways. The visual impact of such development would depend on several variables, including sensitivity of viewers, size of facilities, viewer distance, angle of view, visual absorption capacities, and the structure placement in the landscape. Introduction of new facilities in a highly sensitive and natural area, for example, could substantially degrade the area's visual quality. In addition, operation may introduce substantial sources of nighttime lighting for safety and security purposes.

The reasonably foreseeable compliance responses could also result in mid-life battery replacement of lithium-ion batteries for ~~ZEAS~~zero-emission shuttles which could place additional demand such that existing recycling facilities and manufacturing plants would need to be expanded or modified. Notably, however, ~~ZEAS~~zero-emission shuttle batteries could have a second life when ~~ZEAS~~the shuttles are retired. These batteries could be repurposed and continue to be used. Nevertheless, safe disposal of lithium-ion batteries at the end of life of those batteries is crucial to safeguard the environment and prevent potential adverse impact. For disposal and manufacture of other ~~ZEAS~~zero-emission shuttle lithium-ion batteries, modifications to existing disposal, recycling centers, and manufacturing plants could occur within the confines of such facilities and, therefore, would not result in additions of external equipment that would degrade visual quality. However, development of new recycling facilities, although expected to occur in areas appropriately zoned, could increase the presence of visible human-made elements (e.g., trucks carrying goods for recycling, new structures) in areas of scenic importance. There is uncertainty surrounding the specific locations of new recycling facilities; therefore, adverse effects to scenic vistas or views from a State scenic highway could occur. Further, sources of daytime glare and nighttime lighting associated with these facilities could be introduced.

Therefore, long-term operational-related effects to aesthetics associated with implementation of the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation could be potentially significant.

Potential scenic, glare, and lighting impacts could be reduced to a less-than-significant level by mitigation measures prescribed by local, State, federal, or other land use or permitting agencies (either in the U.S. or abroad) with approval authority over the development projects.

Mitigation Measure 1-2

The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies that provide protection of aesthetic resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with discretionary local land use and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with discretionary project-approval authority. Recognized practices routinely required to avoid and/or minimize impacts to aesthetic resources include:

- Proponents of new or modified facilities constructed as a compliance response to the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body shall certify that the environmental document was prepared in compliance with applicable regulations and approve the project for development.
- The project proponent shall color and finish the surfaces of all project structures and buildings visible to the public to ensure that they: (1) minimize visual intrusion and contrast by blending with the landscape; (2) minimize glare; and (3) comply with local design policies and ordinances. The project proponent shall submit a surface treatment plan to the lead agency for review and approval.
- Siting projects and their associated elements next to prominent landscape features or in a setting for observation from national historic sites, national trails, and cultural resources shall be avoided to the greatest extent.
- The project proponent shall prepare and implement a lighting mitigation plan and submit the plan to the local jurisdiction for review. The plan shall describe the measures to be used to reduce visibility of on-site lighting from neighboring properties.

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this ~~Draft~~Final EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant scenic and nighttime lighting impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this ~~Draft~~Final EA takes the conservative approach in its post-mitigation significance conclusion and discloses that long-term operational-related scenic and nighttime lighting effects resulting from reasonably foreseeable compliance responses to the ZEASZero-Emission Airport Shuttle Regulation would be **potentially significant and unavoidable**.

2. Agriculture and Forestry Resources

Impact 2-1: Short-Term Construction-Related and Long-Term Operational-Related Effects to Agriculture and Forestry Resources

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of ZEASzero-emission shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support ZEASzero-emission shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of ZEASzero-emission airport shuttles could result in a relatively small increase in production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells; however, disposal would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new facilities or modifications to existing facilities could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is implemented at the time of normal bus purchase.

There is uncertainty as to the exact locations of these new and modified facilities and therefore their location in relation to agricultural land, including farmland, land zoned for agricultural use, and land under Williamson Act (Government Code Section 51200 *et seq.*) contract. Similarly, it is uncertain where new and modified facilities would be located in relation to forest land and timberland. Construction and modification of these facilities, though likely to occur in areas with appropriate zoning that would not have agricultural or forestry uses, could result in conversion of agricultural land or forest land if they are sited in areas of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, Williamson Act conservation contracts, forest land or timberland. Some of the conversion would be permanent where facilities are constructed, while

temporary conversion may be needed to facilitate temporary construction activities. Many local governments have adopted land use policies to protect important agricultural and forest land from conversion to urban development, including industrial facilities. Land use policies controlling the location of new industrial facilities and diverting development away from agricultural and forest land could avoid some conversion of agricultural and forest land, but likely would not prevent all substantial conversion of agricultural and forest land. As a result, this impact could be potentially significant.

However, increased use of ~~ZEAS~~zero-emission airport shuttles could result in decreased demand for gasoline, diesel, and CNG fuels in the transportation sector. Therefore, rates and levels of oil and gas extraction and production could also decrease. While there is a degree of uncertainty surrounding the location of any future oil and natural extraction sites, it is foreseeable that such sites could be located on Important Farmland or land supporting forest resources, which could result in the conversion of agricultural or forestland. Therefore, the electrification of the transportation sector could result in the preservation of agriculture and forest resources that may otherwise be converted for oil and gas extraction-related activities.

Increased demand for lithium associated with elevated use of ~~ZEAS~~zero-emission airport shuttles could increase lithium ore extraction internationally. Lithium ore derived from brines typically occurs within desert areas, which would not be considered valuable land for agricultural or forestry practices; however, lithium ore extracted from hard rock mining could result in the loss of agricultural and forest lands of importance depending on where new facilities are located.

Therefore, short-term construction-related and long-term operational-related impacts associated with implementation of the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation on agricultural and forest resources could be potentially significant.

Potential agricultural and forest resource impacts could be reduced to a less-than-significant level by mitigation measures prescribed by local, State, federal, or other land use or permitting agencies (either in the U.S. or abroad) with approval authority over the development projects.

Mitigation Measure 2-1

The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies that provide protection of agricultural and forest resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities or infrastructure that would be approved by other State agencies or local jurisdictions. The ability to require such mitigation measures is within the purview of jurisdictions with discretionary land use approval and/or permitting authority. Project-specific impacts and mitigation would be identified during the project review process and carried out by agencies with discretionary project approval authority. Recognized practices routinely required to avoid and/or minimize construction-phase impacts to agriculture and forest resources include:

- Proponents of new or modified facilities constructed because of reasonably foreseeable compliance responses would coordinate with local or State land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development.
- Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project because CARB has no land use authority, mitigation is not within its purview to reduce potentially significant impacts to less-than-significant levels. Any mitigation specifically required for a new or modified facility would be determined by the local lead agency and future environmental documents by local and State lead agencies should include analysis of the following:
 - Avoid lands designated as Important Farmland (State defined Prime Farmland, Farmland of Statewide Importance, and Unique Farmland) as defined by the Farmland Mapping and Monitoring Program. Before converting Important Farmland to non-agricultural use, analyze the feasibility of using farmland that is not designated as Important Farmland prior to deciding on the conversion of Important Farmland.
 - Avoid lands designated as forest land or timberland before converting forestland or timberland to non-forest use, analyze the feasibility of using other lands prior to deciding on the conversion of forest land or timberland.
 - Any mitigation for permanent conversion of Important Farmland caused by facility construction or modification shall be completed prior to the issuance of a grading or building permit by providing the permitting agency with written evidence of completion of the mitigation. Mitigation may include but is not limited to:
 - Permanent preservation of off-site Important Farmland of equal or better agricultural quality, at a ratio of at least 1:1. Preservation may include the purchase of agricultural conservation easement(s); purchase of credits from an established agricultural farmland mitigation bank; contribution of agricultural land or equivalent funding to an organization that provides for the preservation of Important Farmland towards the ultimate purchase of an agricultural conservation easement.
 - Participation in any agricultural land mitigation program, including local government maintained, that provides equal or more effective mitigation than the measures listed.

- Any mitigation for permanent conversion of forest land or timberland caused by facility construction or modification shall be completed prior to the issuance of a grading or building permit by providing the permitting agency with written evidence of completion of the mitigation. Mitigation may include but is not limited to permanent preservation of forest land or timberland of equal or better quality at a ratio of 1:1 or 1.5:1 because some lost ecological value may not be replaceable. Preservation may include purchase of easements or contribution of funds to a land trust or other agency.

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts related to the conversion of agriculture and forest resources.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that short-term operational-related and long-term operational-related impacts to agriculture and forest resources resulting from the ZEASZero-Emission Airport Shuttle Regulation would be **potentially significant and unavoidable**.

3. Air Quality

Impact 3-1: Short-Term Construction-Related Effects to Air Quality

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of ZEASzero-emission airport shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support ZEASzero-emission shuttles operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of ZEASzero-emission airport shuttles could result in a relatively small increase in production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells; however, disposal would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new facilities or modifications to existing facilities could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is implemented at the time of normal bus purchase.

Construction-related activities, if they occur, would be anticipated to result in an increase in criteria air pollutants and toxic air contaminants (TACs) (e.g., use of heavy-duty construction equipment, trenching, etc.). All projects, no matter their size or type would be required to seek local land use approvals prior to their implementation. Part of the land use entitlement process requires that each of these projects undergo environmental review consistent with California environmental review requirements (e.g., CEQA) and other applicable local requirements (e.g., local air district rules and regulations). This environmental review process would assess whether project implementation would result in short-term construction air quality impacts. Notably, where hydrogen fueling is added to an existing convention gas station, hydrogen fueling stations may fall under CEQA categorical exemptions for (1) expansion of existing facilities, (2) new construction or conversion of small structures, and (3) minor alterations to land. Further, stand-alone hydrogen fueling stations may also qualify for a categorical exemption or a negative declaration under CEQA (Arnold and Porter, 2015).

At this time, the specific location, type, and number of construction activities is not known and would be dependent upon a variety of factors that are not within the control of CARB. Nonetheless, the analysis provided herein provides a reasonable accounting of the types of environmental impacts that would occur with implementation of the ZEAS Zero-Emission Airport Shuttle Regulation as discussed below for short-term construction emissions. Further, subsequent environmental review would be conducted at such time that an individual project is proposed, and land use entitlements are sought.

During the construction phase, criteria air pollutants and TACs could be generated from a variety of activities and emission sources. These emissions would be temporary and occur intermittently depending on the intensity of construction on a given day. Site grading and excavation activities would generate fugitive particulate matter (PM) dust emissions, which is the primary pollutant of concern during construction. Fugitive PM dust emissions (including respirable PM (PM_{10}) and fine PM ($PM_{2.5}$)) vary as a function of parameters such as soil silt content and moisture, wind speed, acreage of disturbance area, and the intensity of activity performed with construction equipment. Site preparation equipment and activities typically include backhoes, bulldozers, loaders, and excavation equipment (e.g., graders and scrapers). Exhaust emissions from off-road construction equipment, material delivery trips, and construction worker-commute trips could also contribute to short-term increases in PM, but to a lesser extent than grading and excavation. Exhaust emissions from construction-related mobile sources also include reactive organic gases and oxides of nitrogen (NO_x) emissions. These emission types and associated levels fluctuate greatly depending on the particular type, number, and duration of usage for the varying equipment.

The site preparation phase typically generates the most substantial emission levels because of the on-site equipment and ground-disturbing activities associated with grading, compacting, and excavation. Although detailed construction specific information is not available at this time, based on the types of activities that could be conducted it would be expected that the primary sources of construction-related emissions include soil disturbance- and equipment-related activities (e.g., use of backhoes, bulldozers, excavators, and other related equipment). Based on typical

emission rates and default parameters for above mentioned equipment and activities, typical construction activities could result in hundreds of pounds of daily NO_x and PM, which may exceed applicable significance thresholds depending on the exact location of generation. Thus, implementation of the ZEASZero-Emission Airport Shuttle Regulation could generate levels that conflict with applicable air quality plans, violate or contribute substantially to an existing or projected violation, result in a cumulatively considerable net increase in non-attainment areas, or expose sensitive receptors to substantial pollutant concentrations.

As a result, short-term construction-related air quality impacts associated with the ZEASZero-Emission Airport Shuttle Regulation could be potentially significant.

This short-term construction-related air quality impact could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB.

Mitigation Measure 3-1

The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies that provide protection of air quality. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be subject to approval by local jurisdictions. The ability to require such measures is within the purview of jurisdictions with local or state land use approval and/or permitting authority. New or modified facilities in California would likely qualify as a “project” under CEQA, because they would generally need a discretionary public agency approval and could affect the physical environment. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices routinely required to avoid and/or minimize impacts to air quality include the following:

- Proponents of new or modified facilities constructed as a result of reasonably foreseeable compliance responses would coordinate with local or state land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local jurisdiction with land use authority would determine that the environmental review process complied with CEQA and other applicable regulations, prior to project approval.
- Based on the results of the environmental review, proponents would implement all feasible mitigation identified in the environmental document to reduce or substantially lessen the construction-related air quality impacts of the project.
- Project proponents would apply for, secure, and comply with all appropriate air quality permits for project construction from the local agencies with air quality jurisdiction and from other applicable agencies, if appropriate, prior to construction mobilization.

- Project proponents would comply with the federal Clean Air Act and the California Clean Air Act (e.g., New Source Review and Best Available Control Technology criteria, if applicable).
- Project proponents would comply with local plans, policies, ordinances, rules, and regulations regarding air quality-related emissions and associated exposure (e.g., construction-related fugitive dust regulations and indirect source review).
- For projects that exceed applicable PM thresholds, prepare and comply with a dust abatement plan that addresses emissions of fugitive dust during construction and operation of the project.

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts. With mitigation, construction emissions, though not likely, could still exceed local air district threshold levels of significance depending on the magnitude of construction activities.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that short-term construction-related air quality impacts resulting from compliance responses associated with the ZEASZero-Emission Airport Shuttle Regulation would be **potentially significant and unavoidable**.

Impact 3-2: Long-Term Operational-Related Effects to Air Quality

CARB modeled criteria and GHG emissions from the airport shuttle fleet with- and without the ZEASZero-Emission Airport Shuttle Regulation in place. The CEQA baseline for determining the existence of any new, or more significant, adverse air quality or greenhouse gas impact is the existing environmental conditions at the time the analysis is conducted (California Code of Regulation, title 14 section 15125). For this project, staff determined the CEQA baseline year is 2017. Staff determined the projected air pollution impacts of the ZEASZero-Emission Airport Shuttle Regulation by comparing the projected mass of emissions for the Business-As-Usual scenario (BAU-ZEASZero-Emission Airport Shuttle), which describes the Airport Shuttle fleet contribution to air pollution in the absence of the ZEASZero-Emission Airport Shuttle Regulation, with the Proposed ZEASZero-Emission Airport Shuttle Regulation scenario (Proposed-ZEASZero-Emission Airport Shuttle), which describes the staff-modeled air pollution impact of the ZEASZero-Emission Airport Shuttle Regulation.

Criteria pollutants were modeled on a tank-to-wheel basis using CARB's EMFAC2017 mobile model. Emissions were estimated by the product of shuttle activity (in terms of VMT) and emission rates (in terms of pollutant mass per unit VMT). Airport shuttle population and vehicle miles traveled (VMT) were based on the result of surveys

conducted by staff. Emissions were estimated by the product of shuttle activity (in terms of VMT) and emission rate (in terms of pollutant mass per unit VMT).

The BAU-ZEASBZero-Emission Airport Shuttle scenario indicates a 2017 airport shuttle tailpipe baseline of 13 tons/year of NOx and 0.2 tons/year of PM_{2.5}. The Proposed-ZEASZero-Emission Airport Shuttle scenario indicates that, by 2035, airport shuttle tailpipe emissions are eliminated, as compared to no action (see Figure 2(a) & (b) and Tables 4.1 & 4.2).

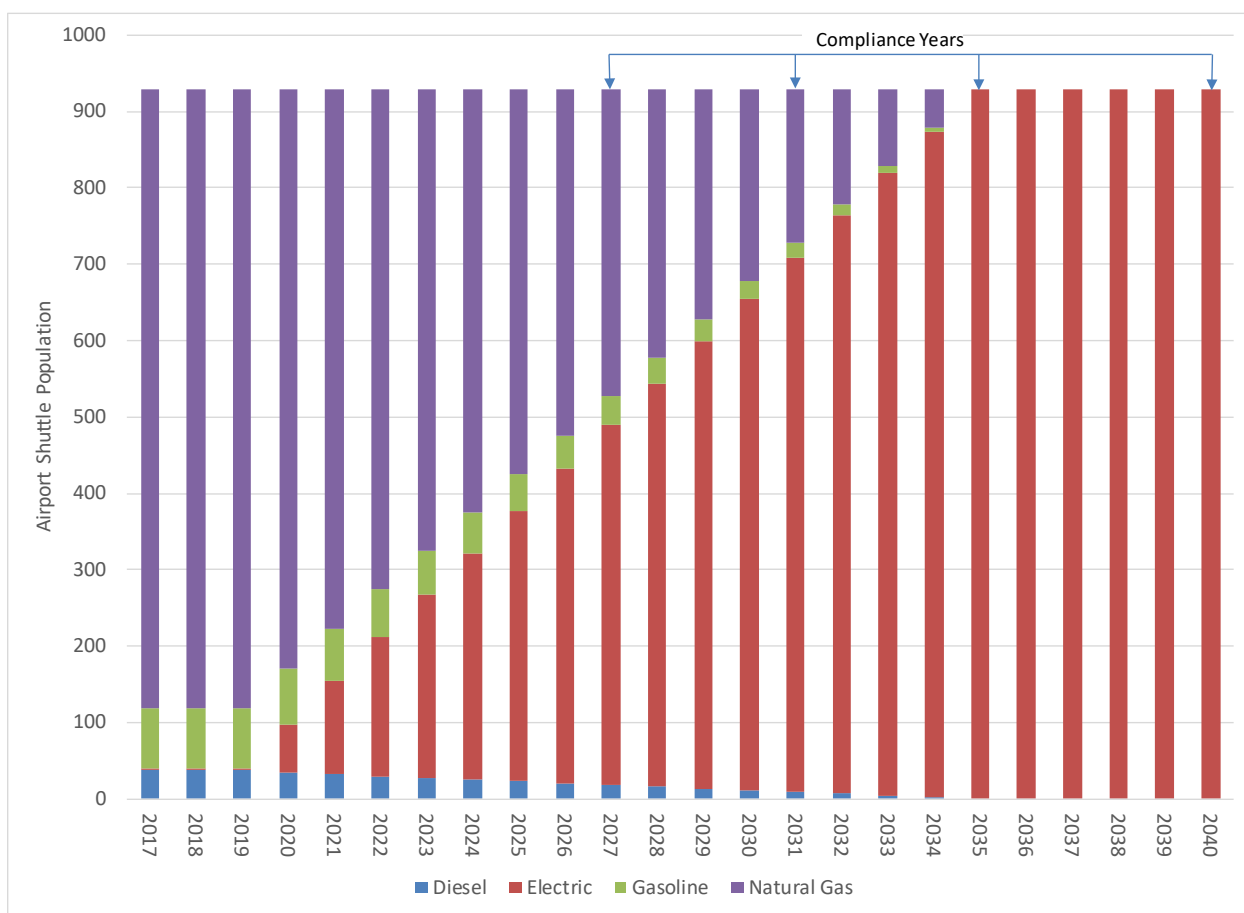
Staff conducted research and surveyed airport shuttle fleets to determine the models' inputs and assumptions such as airport shuttle population, demographics, and activity. Vehicle population growth is assumed constant throughout the period evaluated, due to expected contraction in specific segments of the airport shuttle population. Notably, the addition of light rail connectivity to airports in San Francisco and Los Angeles, which will eliminate up to 60 airport shuttles from the state fleet. Staff derived the 15 mph average speed assumption from in-use data recorded from an airport shuttle. Airport shuttles travel an average of 31,000 miles/year, which was derived from the staff survey. Surveys indicate public fleet airport shuttles have a 12-year average and private fleet airport shuttles have a 10.7-year average life. However, since the private fleet response rate was low, staff aligned private fleets to match the public fleet 12-year average airport shuttle life, which is used for the BAU-ZEASZero-Emission Airport Shuttle scenario.

The Proposed-ZEASZero-Emission Airport Shuttle scenario assumes the ZEASzero-emission airport shuttle fleet replaces combustion airport shuttles according to a 6.25% per year ZEASturnover-shuttle-rate, which approximates a 16-year fleet turnover period. This period reflects additional time allotted in the ZEASZero-Emission Airport Shuttle Regulation for fleets to make a full transition to zero-emission technologies. This provides fleets additional time to schedule ZEASzero-emission airport shuttle purchases due to the current higher cost of the technology and increased planning time necessary for installation of ZEASzero-emission infrastructure. CARB will also provide guidance to fleets on access to financial and other incentives for early adoption of ZEASzero-emission airport shuttle technology.

The airport shuttle population and activity survey was conducted in fourth quarter, 2017, to determine the population, population demographics, and activity of airport shuttles in California. Information collected included total number of vehicles in the fleet, vehicle make, model, model year, weight classification, and annual miles. Surveys were conducted with public and private entities as it was envisioned that the two classes of shuttle operations would have different demographics. The survey had a 100 percent response rate from public entities and a 15 percent response rate from private entities. Specific to private entities, it was determined that the population and activity data had similar characteristics across airport hub sizes (small, medium, large), therefore the data collected for privately-owned airport shuttle operations was extrapolated over the population of private airport shuttle entities across California.

As of 2017, statewide in California, there were a total of 929 airport shuttles of which 264 vehicles provide passenger ground transport in publically provided service and 665 vehicles in privately provided service. Current regulatory structure provides flexibility to fleets to choose the fuel or vehicle technology that best suits them. The market choices are reflected in the current fleet fueling demographics. Today, the airport shuttle market is dominated by CNG, (83 percent), followed by gasoline (9 percent), LPG (4 percent), and diesel (4 percent). In 2017, there is a modest battery electric presence in the California airport shuttle fleet (less than 1 percent). In public airport shuttle fleets, after CNG, LPG is the next dominant fuel, whereas in private fleets, gasoline is the next dominant fuel. As a result of the ZEASZero-Emission Airport Shuttle Regulation, the airport shuttle fleet composition is expected to change as shown in Figure 1, where the fleet shifts to ZEASzero-emission technologies as a function of natural turnover. Note that in 2017, the ZEASzero-emission shuttle signature in the fleet, prior to regulation adoption, illustrates that a segment of airport shuttle industry is organically beginning to experiment with, and adopt, ZEASzero-emission technologies.

Figure 1: Proposed - ZEASZero-Emission Airport Shuttle Scenario Forecast of Airport Shuttle Demographics, 2017-2040

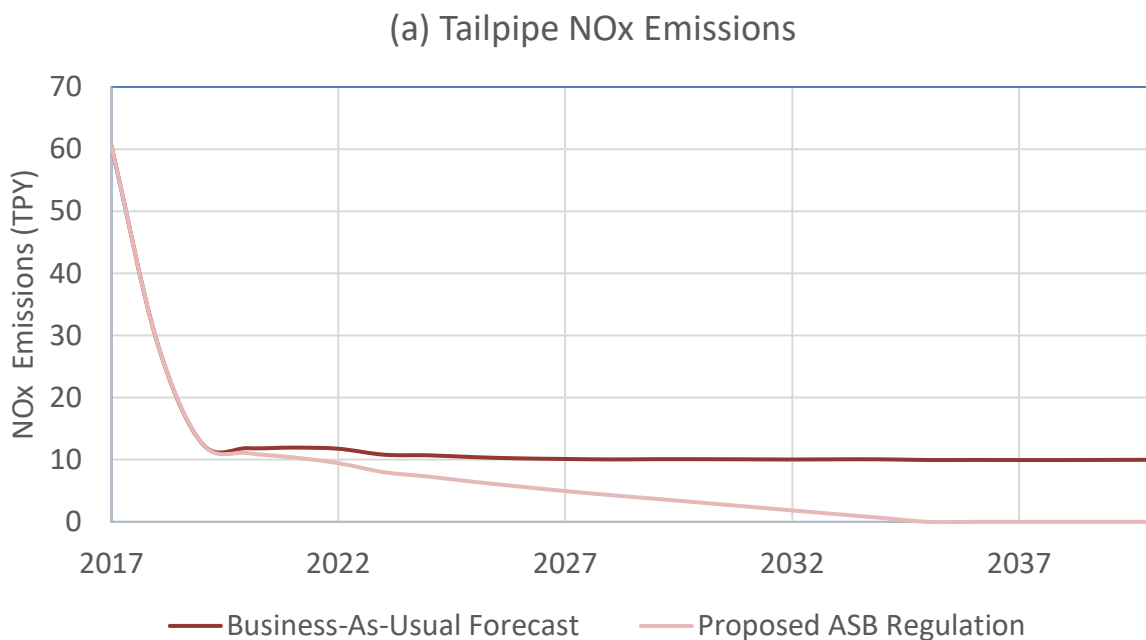


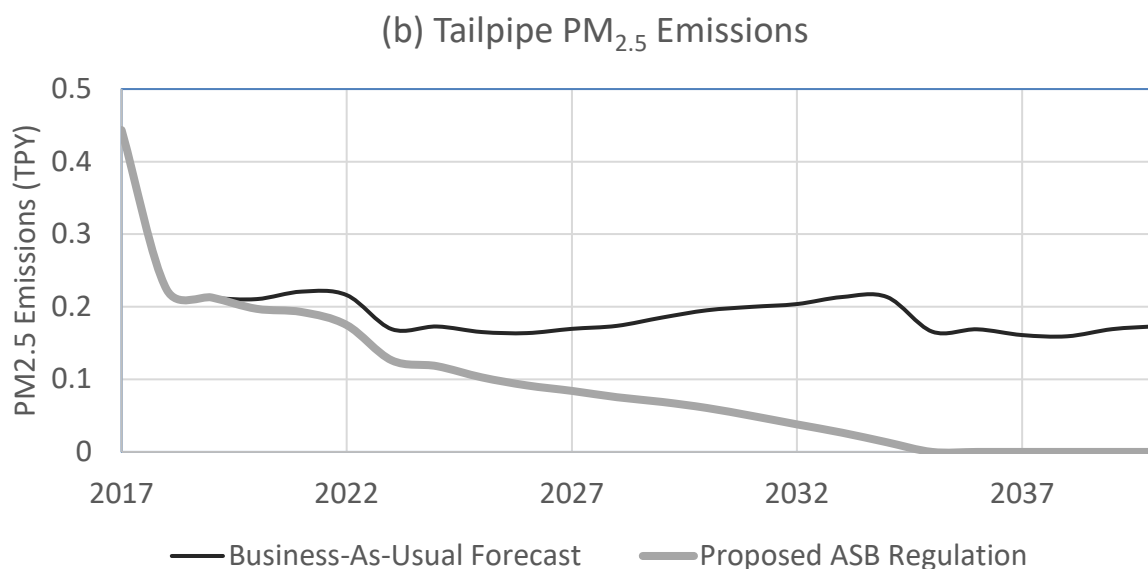
The ZEASZero-Emission Airport Shuttle Regulation is anticipated to deliver PM_{2.5} and NO_x emission reductions. The ZEASZero-Emission Airport Shuttle Regulation will reduce tail pipe emissions from combustion fueled airport shuttles to zero by 2035. The proposal delays mandatory ZEASzero-emission airport shuttle requirements to 2027 to provide fleets maximum time to access incentive funding. Starting in 2023, CARB assumes constant ZEASregulatory compliance, assuming an average airport shuttle life of 12-years, which equates to a linear turnover rate of the existing fleet to ZEASzero-emission shuttles (see Figure 1).

Emission reduction benefits are directly related to the replacement of internal combustion shuttles with equivalent zero-emission shuttles. Figures 2 (a) and (b) characterize the projected tailpipe NO_x and PM_{2.5} emissions under the BAU-ZEASZero-Emission Airport Shuttle and Proposed ZEASZero-Emission Airport Shuttle Regulation scenarios, respectively. These figures also include a 2017 base year trend line, which is an extrapolation of 2017 emissions.

The emission benefit of the ZEASZero-Emission Airport Shuttle regulation is directly proportional to the number of zero-emission shuttles that enter the fleet. As the fleet turns over and the proportion of zero-emission shuttles increases, the emission profile of airports shuttles decreases in a similar proportion, due to the elimination of tailpipe emissions, as demonstrated in each of the Figure 2 charts.

Figure 2: Emission projections of Tailpipe NO_x and PM_{2.5}





Air pollution modeling demonstrates that the ZEASZero-Emission Airport Shuttle Regulation will have its intended effect on reducing all air pollutant emissions. CARB's Proposed ZEASZero-Emission Airport Shuttle Regulation scenario demonstrates how the ZEASZero-Emission Airport Shuttle Regulation will extend a downward trend in NO_x and PM emissions. This scenario models fleets to begin voluntary turnover of their oldest shuttles to zero-emission shuttles starting in 2019, and then as a regulatory requirement from 2027 through 2035. By 2035, all impacted airport shuttles are modeled to turn over to ZEASzero-emission technology and the fleet's tailpipe NO_x and PM_{2.5} emissions drop to zero and the emission reduction benefits continue to accrue through the entire analysis period, ending 2040.

Tables 2 and 3 present the emission benefits from ZEASZero-Emission Airport Shuttle Regulation NO_x and PM_{2.5} for the calendar years 2017, 2027, 2031, 2035 and 2040. Overall, implementation of the ZEASZero-Emission Airport Shuttle Regulation would result in emission benefits relative to the BAU scenario. By 2035, NO_x, and PM_{2.5} would both be reduced by 100%, demonstrating elimination of tailpipe emissions.

Table 2: Tailpipe NO_x Emission Benefits from ZEASZero-Emission Airport Shuttle Regulation (Ton/Year)

Calendar Year	Business As Usual Forecast	Proposed ASB Regulation	Benefit	Percent Reduction
2017	60.50	n/a	n/a	n/a
2027	10.12	4.96	5.17	51%
2031	10.07	2.47	7.60	76%
2035	9.96	0.00	9.96	100%
2040	9.99	0.00	9.99	100%

Table 3: Tailpipe PM_{2.5} Emission Benefits from ZEASZero-Emission Airport Shuttle Regulation (Ton/Year)

Calendar Year	Business As Usual Forecast	Proposed <u>ZEASZero-Emission Airport Shuttle Regulation</u>	Benefit	Percent Reduction
2017	0.44	n/a	n/a	n/a
2027	0.17	0.08	0.09	50%
2031	0.20	0.05	0.15	75%
2035	0.17	0.00	0.17	100%
2040	0.17	0.00	0.17	100%

Operation of new and modified facilities for manufacturing and fueling would consume fuel over the long-term of the program, emitting criteria air pollutants. Fuel would be consumed, for example, to provide electricity during the manufacturing process and for general building operations (e.g., lighting; heating, ventilation, and air conditioning (HVAC) systems). Additionally, vehicle trips for employees and materials would consume fuel. Increased demand for lithium batteries could increase production, lithium mining, and exports from source countries or other states, which would require energy use in the form of fuel consumption for mineral extraction, processing, and transport. However, given the substantial reductions of criteria air pollutants from implementation of the proposed ZEASZero-Emission Airport Shuttle Regulation as compared to the BAU Scenario, summarized in Tables 2 and 3, there would be a net **beneficial** impact related to criteria pollutant emissions.

New and modified facilities would not include activities or processes that are associated with major odor sources (e.g., landfills). Additionally, new people would not be located near existing odor sources because implementation of the ZEASZero-Emission Airport Shuttle Regulation would not include the development of sensitive uses (e.g., residences). Thus, implementation of the ZEASZero-Emission Airport Shuttle Regulation would not create objectionable odors affecting a substantial number of people. As a result, odor impacts would be **less than significant**.

4. Biological Resources

Impact 4-1: Short-Term Construction-Related Effects to Biological Resources

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of ZEASzero-emission shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support ZEASzero-emission shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of ZEASszero-emssion shuttles could results in a relatively small increase production of

electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells; however, disposal would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new facilities or modifications to existing facilities could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is implemented at the time of normal bus purchase.

Construction of new recycling and manufacturing facilities could require disturbance of undeveloped area, such as clearing of vegetation, earth movement and grading, trenching for utility lines, erection of new buildings, and paving of parking lots, delivery areas, and roadways. These activities would have the potential to adversely affect biological resources (e.g., species, habitat) because there could be biological species that occur, or even thrive, in developed settings. Additionally, resources could also be adversely affected by the installation of hydrogen fuel dispensing units at existing gasoline service stations and modifications to existing hydrogen production plants within existing footprints, or at other sites in areas with consistent zoning. Consequently, this impact would be potentially significant.

Therefore, short-term construction-related effects to biological resources associated with the ZEASZero-Emission Airport Shuttle Regulation could be potentially significant.

Potential construction-related biological resources impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 4-1

The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies that provide protection of biological resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local land use and/or permitting authority. New or modified facilities in California would qualify as a "project" under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize impacts to biological resources include:

- Proponents of new or modified facilities constructed as a compliance response to the ZEASZero-Emission Airport Shuttle Regulation would coordinate with local

land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development.

- Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of actions required to mitigate potentially significant biological impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.
- Preparation of a biological inventory of site resources by a qualified biologist prior to ground disturbance or construction. If protected species or their habitats are present, comply with applicable federal and State endangered species acts and regulations. Ensure that important fish or wildlife movement corridors or nursery sites are not impeded by project activities.
- Preparation of a wetland survey of onsite resources. Establish setbacks and prohibit disturbance of riparian habitats, streams, intermittent and ephemeral drainages, and other wetlands. Wetland delineation is required by Section 3030(d) of the Clean Water Act and is administered by the U.S. Army Corps of Engineers.
- Prohibit construction activities during the rainy season with requirements for seasonal weatherization and implementation of erosion prevention practices.
- Prohibit construction activities in the vicinity of raptor nests during nesting season or establish protective buffers and provide monitoring as needed to ensure that project activity does not cause an active nest to fail.
- Preparation of site design and development plans that avoid or minimize disturbance of habitat and wildlife resources, and prevents stormwater discharge that could contribute to sedimentation and degradation of local waterways. Depending on disturbance size and location, a National Pollution Discharge Elimination System (NPDES) construction permit may be required from the California State Water Resources Control Board.
- Plant replacement trees and establish permanently protection suitable habitat at ratios considered acceptable to comply with “no net loss” requirements.

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that short-term construction related impacts to biological resources associated with the ZEASZero-Emission Airport Shuttle Regulation would be **potentially significant and unavoidable**.

Impact 4-2 Long-Term Operational-Related Effects to Biological Resources

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of ZEASzero-emission shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support zero-emission shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of ZEASzero-emission airport shuttles could result in a relatively small increase production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells; however, disposal would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new facilities or modifications to existing facilities could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is implemented at the time of normal bus purchase.

Long-term operation of new manufacturing plants, stations, and recycling facilities would often include the presence of workers; movement of automobiles, trucks, and heavy equipment; and operation of stationary equipment. This environment would not be conducive to the presence of biological resources located on-site or nearby. For example, operation of a new facility could deter wildlife from the surrounding habitat or could impede wildlife movement through the area. This impact would be substantial if there is not adequate habitat nearby. Vegetation management may be necessary to comply with fire codes and defensible space requirements, which may require tree trimming and other habitat modification that could, for example, result in species mortality or nest failure. Consequently, this impact would be potentially significant.

Implementation of the ZEASZero-Emission Airport Shuttle Regulation would increase the number of ZEASzero-emission shuttles within the transportation sector, which would result in higher demand for hydrogen fuel and electricity as well as a reduction in the level of mobile-source fossil fuel use. As a result, rates of oil and gas extraction and its related biological effects would be less. Current oil and gas extraction activities can disrupt wildlife migration routes and habitat from noise pollution, traffic, and fences. Further, accidental release of oil and gas-related substances can pollute important aquatic and terrestrial habitat resulting in adverse effects to biological resources. Due to the deployment of ZEASzero-emission shuttles, such impacts associated with oil

and gas extraction would be reduced as a result of the ZEASZero-Emission Airport Shuttle Regulation.

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in increased mining-related activities, including hard rock and continental brines for the procurement of lithium ore. Mining of hard rock would require the use of conventional mining practices including the creation of underground mines and open pits, which would result in the removal of organic material (e.g., bedrock, vegetation). Hard rock mining of lithium ore and its related effects to biological resources would not be expected to occur within the state or U.S.

Lithium may also be collected from lake brines and clays. This process involves the pumping of salty groundwater into lagoons where it undergoes evaporation producing salts containing lithium compounds. Such activities could result in substantial disturbances to biological resources and could cause a reduction in sensitive habitat, interference with a wildlife corridor, loss of special-status species, or conflict with a habitat conservation plan or natural community conservation plan.

Extraction of lithium can result in the release of chemicals through leaching, spills, or air emissions which can cause harm to ecosystems. Lithium-containing brines are often found in arid territories which support delicate flora and fauna. Water contamination associated with lithium ore extraction could have acute and adverse effects to sensitive habitat and sensitive species (Friends of the Earth, 2013). While the majority of lithium ion from continental brines occurs outside the borders of the U.S., effects to biological resources associated from lithium brine mining operations could foreseeably occur within the State and U.S as demand for lithium rises and lithium stores are discovered.

Therefore, long-term operational-related effects to biological resources associated with the ZEASZero-Emission Airport Shuttle Regulation could be potentially significant.

This impact could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies (in the U.S. and abroad), but is beyond the authority of CARB.

Potential operational-related biological resources impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 4-2

The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies that provide protection of biological resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local land use and/or permitting

authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize impacts to biological resources include:

- Proponents of new or modified facilities constructed as a compliance response to the ZEAS Zero-Emission Airport Shuttle Regulation would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development.
- Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of actions required to mitigate potentially significant biological impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.
- Prohibit vegetation management activities in the vicinity of raptor nests during nesting season or establish protective buffers and provide monitoring as needed to ensure that project activity does not cause an active nest to fail.
- Maintain site design and development plan features that avoid or minimize disturbance of habitat and wildlife resources, and prevents stormwater discharge that could contribute to sedimentation and degradation of local waterways during project operation.
- Maintain and replace, as needed replacement trees and permanently protected suitable habitat identified during the construction phase of the project.

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that long-term operational-related impacts to biological resources associated with the ZEAS Zero-Emission Airport Shuttle Regulation would be **potentially significant and unavoidable**.

5. Cultural Resources

Impact 5-1: Short-Term Construction-Related Effects and Long-Term Operational-Related Effects to Cultural Resources

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of ZEASzero-emission shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support zero-emission shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of ZEASzero-emission airport shuttles could result in a relatively small increase production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells; however, disposal would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new facilities or modifications to existing facilities could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is implemented at the time of normal bus purchase.

Construction of new plants could require disturbance of undeveloped area, such as clearing of vegetation, earth movement and grading, trenching for utility lines, erection of new buildings, and paving of parking lots, delivery areas, and roadways. Demolition of existing structures may also occur before the construction of new buildings and structures. The cultural resources that could potentially be affected by ground disturbance activities could include, but are not limited to, prehistoric and historical archaeological sites, paleontological resources, historic buildings, structures, or archaeological sites associated with agriculture and mining, and heritage landscapes. Properties important to Native American communities and other ethnic groups, including tangible properties possessing intangible traditional cultural values, also may exist. Historic buildings and structures may also be adversely affected by demolition-related activities. Such resources may occur individually, in groupings of modest size, or in districts because culturally sensitive resources can also be located in developed settings, historic, archeological, and paleontological resources, and places important to Native American communities, could also be adversely affected by the installation of hydrogen fuel dispensing units at existing gasoline service stations and as a result of modifications to existing hydrogen production plants within existing footprints, or at other sites in areas with consistent zoning. For example, installation of a new dispensing unit may require ground disturbance that unearths a previously unknown resource (e.g., artifacts). As a result, construction impacts would be potentially significant.

Operation of these facilities would not result in additional ground disturbance beyond that occurring during construction and modification because operation activities would occur within the footprint of the constructed or modified facility. Therefore, most

operational activities would not have the potential to affect archaeological, paleontological, or historical resources. Operation of new facilities may, however, change the visual setting of the surrounding area, which could adversely affect historic resources and districts with a visual component. For example, a new industrial facility may not be consistent with the visual character of a historic district. As a result, operation impacts would be potentially significant.

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in decreased demand for gasoline-, diesel-, and CNG-powered automobiles, which could affect rates of oil and gas extraction. Current oil and gas extraction activities could have the potential to affect important cultural resources through ground moving activities which could unearth or disturb previously unknown historical, cultural, or archeological sources. As such, a decrease in oil and gas extraction activity could reduce potentially adverse effects to cultural resources.

However, due to the possible presence of undocumented cultural resources and paleontological resources in locations of new manufacturing plants, stations, and recycling facilities, short-term construction-related and long-term operational effects to cultural resources associated with the ZEASZero-Emission Airport Shuttle Regulation could be potentially significant.

Potential construction-related and operational-related cultural resources impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 5-1

The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies that provide protection of cultural resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local land use and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize impacts to cultural resources include:

- Proponents of new or modified facilities constructed as a compliance response to the ZEASZero-Emission Airport Shuttle Regulation would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document

was prepared in compliance with applicable regulations and would approve the project for development.

- Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of actions required to mitigate potentially significant cultural impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.
- Retain the services of cultural resources specialists with training and background that conforms to the U.S. Secretary of Interior's Professional Qualifications Standards, as published in Title 36, Code of Federal Regulations, part 61 (36 CFR Part 61).
- Conduct surveys of the project area and surroundings that may be affected by project activities to identify historical resources. Prepare a strategy for addressing impacts to known and unknown historical resources that may be affected by project construction, including avoidance and mitigation strategies in compliance with requirements of CEQA.
- Seek guidance from the State and federal lead agencies, as appropriate, for coordination of Nation-to-Nation consultations with the Native American Tribes.
- Consult with lead agencies early in the planning process to identify the potential presence of cultural properties. The agencies will provide the project developers with specific instruction on policies for compliance with the various laws and regulations governing cultural resources management, including coordination with regulatory agencies and Native American Tribes.
- Retain the services of a paleontological resources specialist with training and background that conforms with the minimum qualifications for a vertebrate paleontologist as described in Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources (Society of Vertebrate Paleontology, 2010).
- Conduct initial scoping assessments to determine whether proposed construction activities would disturb formations that may contain important paleontological resources. Whenever possible potential impacts to paleontological resources shall be avoided by moving the site of construction or removing or reducing the need for surface disturbance. The scoping assessment shall be conducted by the qualified paleontological resources specialist in accordance with applicable agency requirements.
- The project proponent's qualified paleontological resources specialist shall determine whether paleontological resources would likely be disturbed in a project area on the basis of the sedimentary context of the area and a records search for past paleontological finds in the area. The assessment shall suggest areas of high known potential for containing resources. If the assessment is inconclusive a surface survey shall be conducted to determine the fossiliferous

potential and extent of the pertinent sedimentary units within the project site. If the site contains areas of high potential for significant paleontological resources and avoidance is not possible, prepare a paleontological resources management and mitigation plan that addresses the following steps:

- a preliminary survey (if not conducted earlier) and surface salvage prior to construction;
- physical and administrative protective measures and protocols such as halting work, to be implemented in the event of fossil discoveries;
- monitoring and salvage during excavation;
- specimen preparation;
- identification, cataloging, curation, and storage; and
- a final report of the findings and their significance.
- Choose sites that avoid areas of special scientific value.

The authority to determine project-level impacts and require project-level mitigation lies with the land use approval and/or permitting agency for individual projects, and that the programmatic analysis does not allow project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation ultimately implemented to reduce the potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant short-term construction-related and long-term operational-related impacts regarding cultural resources associated with the ZEASZero-Emission Airport Shuttle would be **potentially significant and unavoidable**.

6. Energy Demand

Impact 6-1: Short-Term Construction-Related Impacts on Energy Demand

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of ZEASzero-emission shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support ZEASzero-emission shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of ZEASszero-emssion shuttles could results in a relatively small increase production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells; however, disposal would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life. To meet an increased

demand of refurbishing or reusing batteries and fuel cells, new facilities or modifications to existing facilities could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is implemented at the time of normal bus purchase.

Temporary increases in energy demand associated with construction and modification of facilities would include fuel consumption from use of heavy equipment, vehicles, and generators. Typical equipment that may be necessary for construction includes: graders, scrapers, backhoes, jackhammers, front-end loaders, water trucks, and dump trucks. While energy would be required to complete construction for any new or modified facilities or infrastructure projects, it would be temporary and limited in magnitude such that a reasonable amount of energy would be expended. Additionally, this temporary expenditure of energy is meant to, in the long-term, allow for a transition to vehicles that use less energy. Therefore, energy use during construction would not be wasteful, inefficient, or unnecessary. Short-term construction-related impacts on energy demand, associated with the ZEASZero-Emission Airport Shuttle Regulation would be **less than significant**.

Impact 6-2: Long-Term Operational-Related Impacts on Energy Demand

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of ZEASzero-emission shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support ZEASzero-emission shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of ZEASszero-emssion shuttles could results in a relatively small increase production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells; however, disposal would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new facilities or modifications to existing facilities could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is implemented at the time of normal bus purchase.

In the long term, implementation of the ZEASZero-Emission Airport Shuttle Regulation would be anticipated to result in a shift away from petroleum-based fuels toward hydrogen or electricity in the transportation sector. The electrical grid these electric shuttles would need to represent 50 percent renewable energy generation by 2030, as required by the Clean Energy and Pollution Reduction Act of 2015. Further, a portion of the gaseous and liquid fuels for internal combustion vehicles would also need to use renewable fuels, including RNG and RD. In addition, engine technology that is effectively cleaner than current standards would be required with small impacts on fuel economy.

The proposed ZEASZero-Emission Airport Shuttle Regulation includes options to encourage improved mobility and connectivity with ZEASzero-emission airport shuttles. These efforts would make communities and cities more sustainable and enhance the benefits of investments in cleaner technologies by reducing growth in passenger vehicle miles traveled (VMT). In the longer-term, advanced transportation systems and technologies, such as zero-emission microtransit, have the potential to be a transformative element of a cleaner, safer, and more efficient transportation system.

According to Appendix F of the CEQA Guidelines, the wise and efficient use of energy includes:

1. Decreasing overall per capita energy consumption;
2. Decreasing reliance on fossil fuel such as coal, natural gas, and oil; and
3. Increasing reliance on renewable energy sources.

Increased deployment of ZEASzero-emission shuttles under the ZEASZero-Emission Airport Shuttle Regulation would place additional demand on the existing electricity grid; however, the ZEASZero-Emission Airport Shuttle Regulation would be implemented in conjunction with other statewide regulatory programs aimed at improving the State's per capita energy consumption, decrease reliance on fossil fuels, and increase reliance of renewable energy sources. Over the ZEASZero-Emission Airport Shuttle Regulation's lifespan, the State's energy portfolio would concurrently become more renewable as regulations such as the Renewable Portfolio Standard (RPS) and the Clean Energy and Pollution Reduction Act (SB 350) (Chapter 547, Stats. of 2015) require more stringent mandates. It would be expected that the electricity required to power BEBs or to produce hydrogen under the ZEASZero-Emission Airport Shuttle Regulation could be supplied by renewable forms of electricity (e.g., solar, wind) as the State progresses towards its goal of 50 percent renewable energy targets mandated under SB 350.

Furthermore, public utilities are implementing a series of strategies (e.g., special rate plans) to adequately distribute the additional energy demand generated by electric vehicles as other regulations such as CARB's ZEV Program and the Sustainable Communities and Climate Protection Act (SB 375) introduce more ZEVs to the transportation sector. Modifications to existing infrastructure coupled with economic incentives to affect consumer behavior would continue to occur and would be sufficient to accommodate this increase in electricity demand (Massachusetts Institute of Technology, 2011). Implementation of the ZEASZero-Emission Airport Shuttle Regulation would introduce an incremental addition of energy as ZEASzero-emission shuttles are incorporated into the transportation sector.

Under the ZEASZero-Emission Airport Shuttle Regulation, use of FCEBs could increase. At the time of writing this DraftFinal EA, there are several methods of hydrogen production with varying degrees of energy cost and feasibility. The most common industrial method for hydrogen production is steam methane reformation, which entails combining methane (i.e., natural gas) with steam to produce carbon monoxide and hydrogen. Methane can be sourced geologically and biologically (e.g.,

biogas from landfills, animal waste, and wastewater treatment facilities). Hydrogen can also be derived from electrolysis, which uses electricity to split water molecules into gaseous forms of hydrogen and oxygen. Electricity can be sourced from the burning of fossil fuels as well as from renewable resources (Union of Concerned Scientists, 2015). Other methods include biomass gasification, biophotolysis, thermochemical production, and photochemical production; however, these methods are still in development.

Under the ZEASZero-Emission Airport Shuttle Regulation, it is reasonably foreseeable that recycling of lithium-ion batteries could increase as ZEASzero-emission shuttles reach their end of life. Operation of new or expanded recycling facilities could require substantial energy use to process, breakdown, and refurbish batteries. However, there is inherent uncertainty as to the location and size of new or expanded recycling facilities; therefore, the total energy demand for any future facility is speculative. Additionally, facilities that are expanded to accommodate lithium-ion battery recycling would likely increase energy consumption incrementally as compared to current levels.

Production of hydrogen fuel and operation of recycling facilities could place additional demand on the existing electricity grid; however, as previously discussed, through the implementation of other statewide regulatory programs, electricity resources would become an increasingly larger portion of the state's electricity portfolio. It would be expected that electricity derived from the burning of fossil fuels would decrease over time as electricity produced from renewable resources replaces such sources.

Furthermore, implementation of the ZEASZero-Emission Airport Shuttle Regulation would decrease the amount of fossil fuel-based vehicular fuels (i.e., gasoline, diesel, and CNG) and the recycling need for changed oil and other parts through increased use of ZEASzero-emission airport shuttles, alter community design to support enhanced mobility, and improve efficiency in the transportation sector. Thus, there would be a net **beneficial** long-term operational impact related to energy consumption.

7. Geology and Soils

Impact 7-1: Short-Term Construction-Related and Long-Term Operational-Related Effects to Geology and Soils

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of ZEASzero-emission shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support ZEASzero-emission shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of ZEASzero-emission shuttles could result in a relatively small increase production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells; however, disposal would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the

end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new facilities or modifications to existing facilities could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is implemented at the time of normal bus purchase.

Although it is reasonably foreseeable that these construction activities could occur, there is uncertainty as to the exact location of new facilities and, as a result, there is uncertainty as to geologic conditions at project sites. Furthermore, characteristics of any new facilities and what kinds of modifications to existing facilities would occur. Construction activities could require disturbance of undeveloped areas, such as clearing of vegetation, earth movement and grading, trenching for utility lines, erection of new buildings, and paving of parking lots, delivery areas, and roadways. These activities would have the potential to adversely affect soil and geologic resources in construction areas.

Project implementation would not result in the addition of new sensitive receptors (e.g., housing, schools) to seismic and geologic hazards. New and modified facilities and infrastructure associated with compliance responses under the ZEASZero-Emission Airport Shuttle Regulation could be located in a variety of geologic, soil, and slope conditions with varying amounts of vegetation that would be susceptible to soil compaction, soil erosion, and loss of topsoil during construction. For example, grading for new buildings could increase the potential for erosion or could further destabilize existing landslide conditions. It is not expected, however, that building construction would exacerbate seismicity due to the nature of construction activities (e.g., no groundwater injection is anticipated). As such, implementation of the ZEASZero-Emission Airport Shuttle Regulation would not be expected result in effects to seismicity. The level of susceptibility to geologic effects, such as erosion and landslides, varies by location and geologic conditions. However, the specific design details, siting locations, and soil compaction and erosion hazards for manufacturing facilities are not known at this time and would be analyzed on a site-specific basis at the project level.

Through the deployment of ZEASzero-emission shuttles, implementation of the ZEASZero-Emission Airport Shuttle Regulation could decrease demand for gasoline, diesel, and CNG fuels, thus potentially reducing the amount and rate of oil and gas extraction activities. Fracking, in particular, can induce microseismic events from the modification of local tectonic stress. Further, chemical additives may affect the geochemistry of rocks in the mid- and long-term (European Parliament, 2012). As discussed under Impact 4-2, "Long-Term Operational-Related Effects to Biological Resources," oil and gas extraction can result in loss of habitat and vegetation, which could induce erosion of soils near drilling sites. As the ZEASZero-Emission Airport Shuttle Regulation is implemented and ZEASzero-emission shuttles replace internal combustion-powered shuttles, demand for these activities could decrease, which would reduce the likelihood of adverse geological effects occurring as a result of oil and gas extraction.

Implementation of the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation could result in increased demand for lithium-ion batteries for ~~ZEAS~~zero-emission shuttles, which could cause a surge in lithium-extraction activity within the U.S. as well as internationally. Hard rock lithium ion extraction, which would be expected to occur outside of the state and U.S. would have adverse effects to erosion from potential loss of forests and soil disturbance (Kinal, 2017).

Therefore, short-term construction-related and long-term operational impacts to geology and soils associated with the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation could be potentially significant.

The impacts to geology and soil resources could be reduced to a less-than-significant level by mitigation that can and should be implemented by federal, State, and local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 7-1

The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies that provide protection of geology and soils. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local land use and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize impacts to geology and soils include:

- Proponents of new or modified facilities constructed as a compliance response to the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development.
- Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of actions required to mitigate potentially significant geology and soil impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.
- Prior to the issuance of any development permits, proponents of new manufacturing plants and hydrogen fueling stations would prepare a geotechnical investigation/study, which would include an evaluation of the depth to the water

table, liquefaction potential, physical properties of subsurface soils including shrink-swell potential (expansion), soil resistivity, slope stability, minerals resources and the presence of hazardous materials.

- Proponents of new manufacturing plants and hydrogen fueling stations would provide a complete site grading plan, and drainage, erosion, and sediment control plan with applications to applicable lead agencies. Proponents would avoid locating facilities on steep slopes, in alluvial fans and other areas prone to landslides or flash floods, or with gullies or washes, as much as possible.

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant short-term construction-related and long-term operational-related impacts to geology and soils associated with the ZEASZero-Emission Airport Shuttle Regulation would be **potentially significant and unavoidable**.

8. Greenhouse Gases

Impact 8-1: Short-Term Construction-Related and Long-Term Operational-Related Effects on GHGs

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of ZEASzero-emission shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support ZEASzero-emission shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of ZEASszero-emssion shuttles could results in a relatively small increase production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells; however, disposal would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new facilities or modifications to existing facilities could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is implemented at the time of normal bus purchase.

Construction of facilities would require use of vehicles and equipment that would consume fuel and emit GHGs for construction activities, materials transport, and worker commutes. Construction-related GHG emissions would be temporary and last only for the duration of construction. Local agencies, such as air pollution control districts, are generally charged with determining acceptable thresholds of GHG emissions, measured in metric tons of carbon dioxide equivalent per year (MT CO₂e/year). Quantification of short-term construction-related GHG emissions is generally based on a combination of methods, including the use of exhaust emission rates from emissions models, such as OFFROAD 2007 and EMFAC 2017. These models require consideration of assumptions, including construction timelines and energy demands (e.g., fuel and electricity). Some local agencies (SCAQMD, 2008; SMAQMD 2018) do not recommend or require the quantification of short-term construction-generated GHGs for typical construction projects because these only occur for a finite period of time which is typically much shorter than the operational phase. These local agencies generally recommended that GHG analyses focus on operational phase emissions, as discussed below, unless the project is of a unique nature requiring atypical (e.g., large scale, long-term) construction activity levels (e.g., construction of a new dam or levee) for which quantification and consideration (e.g., amortization of construction emissions over the lifetime of the project) may be recommended (South Coast Air Quality Management District 2008). However, GHGs could have a long lifespan, it is important that the ZEASZero-Emission Airport Shuttle Regulation's benefits outweighs the emissions from the construction level.

Additionally, this temporary increase in emissions of GHGs is meant to, in the long-term, allow for a transition to vehicles that reduce overall emissions of GHG. Therefore, when these short-term construction-related GHG emissions associated with construction activities under the ZEASZero-Emission Airport Shuttle Regulation are considered in relation to the overall long-term operational GHG benefits discussed below, they are not considered substantial.

CARB staff modeled GHG emissions from the airport shuttle fleet with- and without the ZEASZero-Emission Airport Shuttle Regulation in place. The CEQA baseline for determining the existence of any new, or more significant, adverse greenhouse gas impact is the existing environmental conditions at the time the analysis is conducted (California Code of Regulation, title 14 section 15125). For this project, staff determined the CEQA base year is 2017. Staff determined the projected air pollution impacts of the ZEASZero-Emission Airport Shuttle Regulation by comparing the projected mass of emissions for the Business-As-Usual scenario (BAU-ZEASZero-Emission Airport Shuttle), which describes the Airport Shuttle fleet contribution to air pollution in the absence of the ZEASZero-Emission Airport Shuttle Regulation, with the Proposed ZEASZero-Emission Airport Shuttle Regulation scenario (Proposed-ZEAS), which describes the staff-modeled GHG impact of the ZEASZero-Emission Airport Shuttle Regulation.

Greenhouse gas emissions were modeled on a Well-to-Wheel basis, using CARB's Vision2.12 model. Emissions were estimated by the product of shuttle activity (in terms

of VMT) and emission rates (in terms of pollutant mass per unit VMT). Airport shuttle population and vehicle miles traveled (VMT) were based on the result of surveys conducted by staff. Emissions were estimated by the product of shuttle activity (in terms of VMT) and emission rate (in terms of pollutant mass per unit VMT).

The BAU-ZEASZero-Emission Airport Shuttle scenario indicates a 2017 airport shuttle lifecycle baseline of 0.042 million metric tons CO₂e/year of GHG. The Proposed-ZEASZero-Emission Airport Shuttle scenario indicates that, by 2040, ZEASairport shuttle lifecycle GHG emissions are reduced by 90 percent, as compared to no action (see Figure 2 and Tables 4.3).

The Proposed-ZEASZero-Emission Airport Shuttle scenario assumes the ZEASzero-emission airport shuttle fleet replaces combustion fueled airport shuttles according to a 6.25% per year ZEAS turnover rate, which approximates a 16-year fleet turnover period. This period reflects additional time allotted in the ZEASZero-Emission Airport Shuttle Regulation for fleets to make a full transition to zero-emission technologies. This provides fleets additional time to schedule ZEASzero-emission shuttle purchases due to the current higher cost of the technology and increased planning time necessary for the installation of ZEASzero-emission shuttle infrastructure. Figure 1 expresses the airport shuttle population demographics for the Proposed-ZEASZero-Emission Airport Shuttle scenario as a function of time.

The ZEASZero-Emission Airport Shuttle Regulation will significantly reduce lifecycle GHG emissions from the ASB fleet by 2040. The proposal delays the first regulatory ZEAS compliance date to 2027 to provide fleets maximum time to access pre-regulatory incentive funding. Air pollution modeling assumes constant turnover of the fleet to ZEASzero-emission shuttles starting in 2023, assuming an average ZEASairport shuttle life of 12-years, which equates to a linear turnover rate of the existing fleet to ZEASzero-emission technologies (Figure 1).

Emission reduction benefits are directly related to the replacement of internal combustion shuttles with equivalent zero-emission shuttles. Figure 3 characterizes the projected lifecycle GHG emissions under the BAU-ZEASZero-Emission Airport Shuttle and Proposed ZEASZero-Emission Airport Shuttle Regulation scenarios.

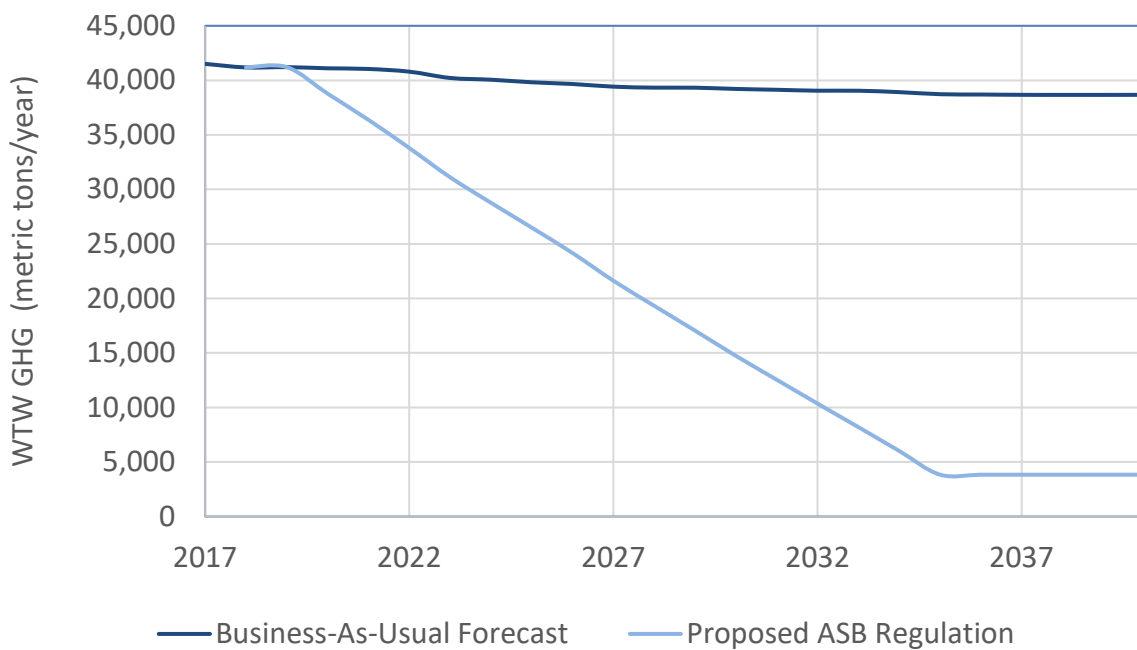
The GHG emission benefit of the ZEASZero-Emission Airport Shuttle ~~r~~Regulation is directly proportional to the number of zero-emission shuttles that enter the fleet. As the fleet turns over and the proportion of zero-emission shuttles increases, the GHG emission profile of airport shuttles decreases in a similar proportion, due to the reduction of upstream GHG and elimination of tailpipe emissions, as demonstrated in Figure 3.

Air pollution modeling demonstrates that the ZEASZero-Emission Airport Shuttle Regulation will have its intended effect on reducing all air pollutant emissions and will have the most significant impact on GHG emissions. With regard to GHG (Figure 3), the reductions are primarily a function of zero-emission shuttles displacing fossil fuel-

powered shuttles. The sharp linear decrease in GHG emissions tracks the replacement rate of combustion-powered shuttles with ZEASzero-emission shuttles, demonstrated in Figure 3. Also captured in the analysis are the GHG reduction benefits associated with displacing upstream fossil fuel production with electricity generation, which has an inherently cleaner footprint than fossil fuel production that continues to improve as the electric grid shifts towards a higher proportion of renewably derived electrical power. Although the ZEASZero-Emission Airport Shuttle Regulation Scenario does not display the estimated GHG reduction after 2040, staff anticipates that GHG will continue to decrease through 2050, as the electric grid shifts towards 100 percent renewable electricity generation.

Addressing the BAU scenario, fossil fuel combustion and GHG emissions are inextricably linked. Therefore, in Figure 3, the ASB BAU Scenario projects a very slight decrease in GHG emissions over time, indicating that, absent this regulation, the fleet will replace older vehicles with newer vehicles that have marginal efficiency improvements in combustion engine and vehicle design. Consequently, in the ZEASZero-Emission Airport Shuttle BAU Scenario, the rate of GHG emissions would decrease only slightly over time.

Figure 3: Emission projections of lifecycle GHG



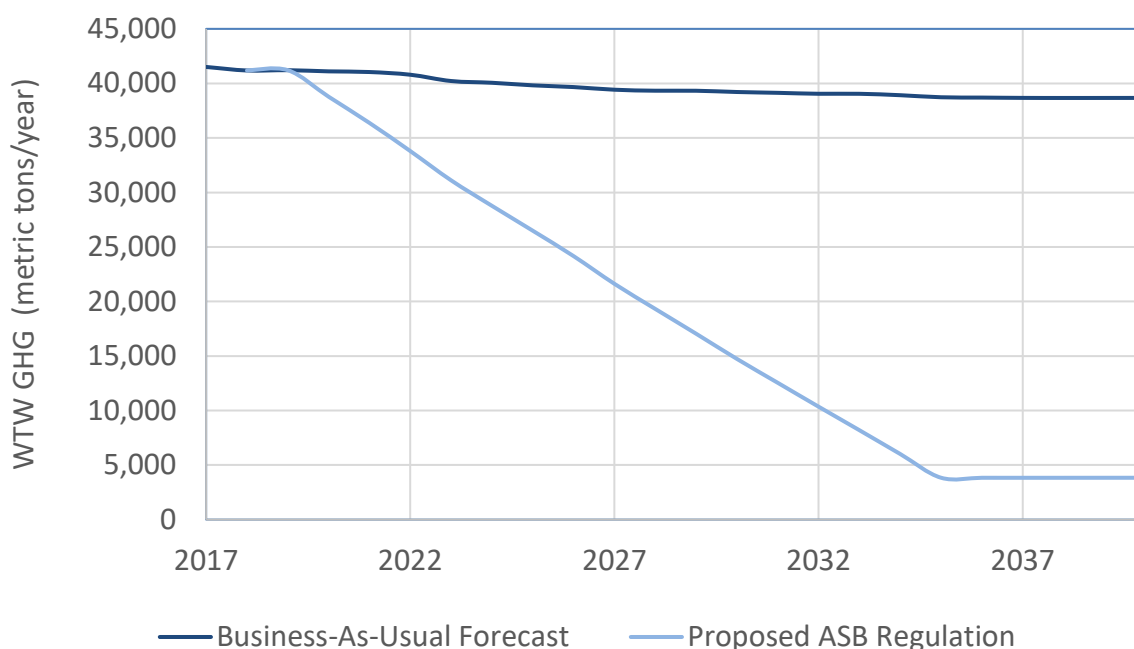


Table 4: GHG Emission Benefits from ZEASZero-Emission Airport Shuttle Regulation (Metric Ton CO₂e per Year)

Calendar Year	Business As Usual Forecast	Proposed ASB Regulation	Benefit	Percent Reduction
2017	41,507	n/a	n/a	n/a
2027	39,420	21,619	17,800	45%
2031	39,134	12,542	26,592	68%
2035	38,728	3,836	34,892	90%
2040	0.17	0.00	0.17	100%

Table 4 expresses the emission benefits from ZEASZero-Emission Airport Shuttle Regulation for GHGs for the calendar years 2017, 2027, 2031, 2035 and 2040. By 2035 and for each year, thereafter, lifecycle GHG will be reduced by 90 percent. The 2040 endpoint demonstrates that well-to-wheel GHG emission reductions less than a 100 percent reduction due to GHGs resulting from the generation of electricity using non-renewable resources.

Implementation of the ZEASZero-Emission Airport Shuttle Regulation would result in the construction and operation of electric vehicle charging stations and hydrogen fueling station to support the deployment of electric and hydrogen-fuel cell powered heavy-duty vehicles. The availability of such infrastructure would improve the accessibility and feasibility of using ZEASzero-emission shuttles as compared to internal combustion-powered vehicles. ZEASZero-emission airport shuttle use, coupled with regulatory improvements to increase statewide renewable energy usage (e.g., the Renewable Portfolio Standard, the Clean Energy and Pollution Reduction Act (SB 350)), would further serve to reduce GHG emissions from the transportation sector. As a greater

portion of the state's energy portfolio is sourced from renewable energy, electricity generated from renewable resources will become available to power electric automobiles and generate hydrogen fuels.

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in decreased demand for fossil fuels and reduce rates of oil and gas extraction and associated emissions. Use of ZEASzero-emission airport shuttles would displace GHG emissions generated from internal combustion engines to emissions generated from the energy sector. However, as discussed under Impact 6-2, "Long-Term Operational-Related Effects to Energy," various regulatory programs (i.e., RPS, SB 350) would be implemented concurrently with the ZEASZero-Emission Airport Shuttle Regulation which would reduce GHG emissions from the energy sector through the transition to renewable energy statewide. For example, as mandated by SB 350, the State must achieve 50 percent renewable energy by 2030. Subsequently, ZEASzero-emission airport shuttles and other EVs could receive electricity from renewable resources (e.g., solar, wind).

Additionally, under the ZEASZero-Emission Airport Shuttle Regulation, use of FCEBs could increase, which would produce new demand for the production and manufacture of hydrogen fuel. At the time of writing this ~~Draft~~Final EA, the most common hydrogen production process is steam methane reforming, which entails combining methane and steam to produce CO and hydrogen. Methane can be derived through geologic gas extraction as well as from biological sources (i.e., biogas from landfills, animal waste, and wastewater treatment plants). Notably, the GHG contribution from FCEBs fueled by hydrogen derived from geological methane is still less than that produced from internal combustion engines. Hydrogen can also be produced through electrolysis of water, which splits water molecules into gaseous forms of hydrogen and oxygen (Union of Concerned Scientists, 2015).

These methods of hydrogen production require high levels of electricity; however, as stated previous, hydrogen production occurring within the boundaries of the State would use electricity derived from an increasing percentage of renewable energy as regulatory programs take effect. As such, use of FCEBs would overall have a net benefit effect on climate change as compared to continued use of internal combustion vehicles.

Operation of new and modified facilities for manufacturing, fueling, and recycling would consume fuel over the long-term of the program. Fuel would be consumed, for example, to provide electricity during the manufacturing and recycling processes, and for general building operation (e.g., lighting; HVAC systems). Additionally, vehicle trips for employees and materials would consume fuel. Increased demand for lithium batteries could increase production, lithium mining, and exports from source countries or other states, which would require energy use in the form of fuel consumption for mineral extraction, processing, and transport. In addition to changes for short-term construction, the demand for RD and RNG is not expected to change the amount used in California to meet the Low Carbon Fuel Standard (LCFS) compliance requirements, but may be temporarily prioritized for shuttles rather than other vehicle types. Shuttle fleet

turnover would occur at time of normal bus purchase. As more ZEASzero-emission airport shuttles are introduced into the fleet, electricity and hydrogen use would increase, and the use of other liquid or gaseous fuels that emit GHGs would decrease. The higher efficiency of ZEASzero-emission airport shuttles compared to combustion vehicles would reduce total energy use in transportation and would provide GHG emissions reductions that aren't already attributed to the LCFS regulation.

Implementing the ZEASZero-Emission Airport Shuttle Regulation is anticipated to result in a reduction of GHG emissions from more efficient use of energy. These benefits would be greater than a comparatively small level of GHG emissions related to short-term construction-related GHG emissions and operation of facilities associated with the compliance responses, as described above. As a result, implementation of the ZEASZero-Emission Airport Shuttle Regulation would result in a **beneficial** impact to GHG emissions.

9. Hazards and Hazardous Materials

Impact 9-1: Short-Term Construction-Related Effects on Hazardous Materials

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of ZEASzero-emission shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support ZEASzero-emission shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of ZEASzero-emission shuttles could result in a relatively small increase production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells; however, disposal would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new facilities or modifications to existing facilities could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is implemented at the time of normal bus purchase.

Construction activities would use heavy-duty equipment requiring periodic refueling and other maintenance. Large pieces of construction equipment (e.g., backhoes, graders) are typically fueled and maintained as needed at the construction site. There is a potential for spills and releases of fuels and other hazardous materials during refueling and maintenance activities. There is also a potential that hazardous materials may be transported near sensitive receptors, such as schools. Although precautions would be taken to ensure that any hazardous materials are properly contained and disposed, and spills are typically minor and limited to the immediate area of the fueling or maintenance, the potential still remains for a release of hazardous materials into the environment that could cause adverse public health and environmental effects.

Consequently, the project could create 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.

Therefore, short-term construction-related impacts to hazards and hazardous materials associated with the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation could be potentially significant.

The impacts to hazards and hazardous materials could be reduced to a less-than-significant level by mitigation that can and should be implemented by federal, State, and local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 9-1

The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies related to hazards and hazardous materials. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with discretionary local land use and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with discretionary project approval authority. Recognized practices that are routinely required to avoid upset and accident-related impacts include:

- Proponents of new or modified facilities constructed as a compliance response to the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development.
- Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of actions required to mitigate potentially significant upset and accident-related hazard impacts may include as discussed below; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.
- Handling of potentially hazardous materials/wastes shall be performed by or under the direction of a licensed professional with the necessary experience and knowledge to oversee the proper identification, characterization, handling and disposal or recycling of the materials generated as a result of the project. As

wastes are generated, they shall be placed, at the direction of the licensed professional, in designated areas that offer secure, secondary containment and/or protection from storm water runoff. Other forms of containment may include placing waste in steel bins or other suitable containers pending profiling and disposal or recycling.

- The temporary storage and handling of potentially hazardous materials/wastes shall be in areas away from sensitive receptors such as schools or residential areas. These areas shall be secured with chain-link fencing or similar barrier with controlled access to restrict casual contact from non-project personnel. All project personnel that may encounter potentially hazardous materials/wastes shall have the appropriate health and safety training commensurate with the anticipated level of exposure.

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant short-term construction-related impacts regarding hazards and hazardous materials associated with the ZEASZero-Emission Airport Shuttle Regulation would be **potentially significant and unavoidable**.

Impact 9-2: Long-Term Operational-Related Effects on Hazardous Materials

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of ZEASzero-emission shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support ZEASzero-emission shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of ZEASzero-emission shuttles could result in a relatively small increase production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells; however, disposal would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new facilities or modifications to existing facilities could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is implemented at the time of normal bus purchase.

The long-term operation of new plants, stations, and modifications would result in the routine transport, use, and disposal of hazardous materials (i.e., lithium-ion batteries, fuel cells, and hydrogen). Compared to construction, use of hazardous materials during operations would be more likely to occur indoors, in a contained area, limiting the potential effects of spills and accidents; or outdoors, during the movement of raw goods to manufacturing facilities or the export of finished goods containing hazardous materials following the manufacturing process. However, the transport, use, and disposal of hazardous materials would be required to comply with all applicable federal, State, and local laws that would reduce the potential for accidents and require certain actions should a spill or release occur.

Batteries used in battery electric and fuel cell electric shuttles are generally lithium based. Lithium is currently sourced in two ways: from hardrock mining and from the evaporation of salt brines. Lithium from rock sources is primarily produced from spodumene, a lithium/aluminum/silicate mineral. Salt brine sources include salt lakes, which are currently the main source of lithium, and geothermal brines and salt brines associated with oil deposits.

Lithium is the lightest solid metal. It can be absorbed into the body by inhalation of its aerosol and by ingestion and is corrosive to the eyes, the skin, and the respiratory tract. Lithium reacts violently with strong oxidants, acids, and many compounds (hydrocarbons, halogens, halons, concrete, sand, and asbestos) causing a fire and explosion hazard. In addition, lithium reacts with water, forming highly flammable hydrogen gas and corrosive fumes of lithium hydroxide. Lithium hydroxide represents a potentially substantial environmental hazard, particularly to water organisms.

However, lithium ion batteries contain potentially toxic materials including heavy metals, such as copper and nickel, and organic chemicals, like toxic and flammable electrolytes (Zeng et al., 2015). Improper management of lithium-ion batteries could pose an environmental hazard and be a concern of public safety. There have been some cases with consumer products containing lithium-ion batteries catching fire after or during transportation to disposal facilities. Once ignited, the resulting fires can be especially difficult to extinguish as temperatures can rapidly increase to up to 500 degrees Celsius (932 degrees Fahrenheit) as a result of interactions between a battery's cathodes and anodes (Battery University, 2018a). The likelihood to overheat or ignite is increased if the batteries are poorly packaged, damaged, or exposed to a fire or a heat source. However, when packaged and handled properly, lithium batteries should pose no environmental hazard (79 Fed. Reg. 46011, 46032), and therefore no increased demand on public services related to emergency responders is anticipated.

All batteries have a finite life time. Proper disposal at the end of battery life is important for environmental protection. However, the batteries used by ~~ZEAS~~zero-emission airport shuttles are expected to outlast the shuttles and the cost of recycling may not be incurred by the fleet owners. Lithium-ion batteries containing no precious metal may have less incentive for recycling due to lengthy processing and purification processes of the raw materials and the associated costs with disposal. Estimated disposal cost for

lithium-ion are \$4,000 - \$5,000 per ton (Battery University, 2018b). Disposal of lithium-ion batteries within the State is required to be in compliance with California law, including but not limited to the Hazardous Waste Control law and implementing regulations (e.g. the Universal Waste Rule, which requires used batteries to be managed as hazardous waste and prohibits the disposal of used batteries to solid waste landfills). For lithium-ion batteries it is anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life.

In addition, lithium-ion batteries may be recycled, and due to increasing demand for ZEASzero-emission shuttles and technologies coupled with high demand for limited cobalt supply, rates and volume of lithium-ion battery recycling has increased (USGS, 2017a). To date, there are ten specialized companies processing and recycling lithium-ion batteries in the U.S. and Canada. However, ZEASzero-emission shuttle batteries may be reused as such batteries have a second life. At present, recycling activities for lithium-ion batteries primarily serve to conserve cobalt, which by comparison, is a rarer material (U.S. EPA, 2013). While lithium-ion batteries used in ZEASzero-emission airport shuttles do not generally contain cobalt, use of consumer products such as cell phones and other electronics combined with cobalt ore constraints may incent the increased recycling of lithium batteries. Due to the expense of cobalt mining, limited cobalt ore, and social-justice issues associated with the cobalt industry, the recycling of lithium containing such elements has risen in recent years. However, any recycling of batteries must be done in compliance with existing laws and regulations.

ZEASZero-emission shuttles introduced to the transportation sector as a result of the implementation of the ZEASZero-Emission Airport Shuttle Regulation could reduce reliance on fossil fuel-powered vehicles, which could result in decrease demand for gasoline, diesel, and CNG as well as the activities required to extract them. The process of extracting and producing oil and gas presents numerous opportunities for the introduction of hazardous materials to human and natural environments. Oil and gas extraction requires the use of chemicals that can be harmful to human and biological health and produces toxic wastewater and air contaminants. Additionally, accidental release of oil and gas products may occur during distribution through piping and freight, which introduces hazards including pollution and explosion. Through the use of ZEASzero-emission airport shuttles under the ZEASZero-Emission Airport Shuttle Regulation, these hazards associated with oil and gas extraction and distribution would be less as the demand for internal combustion vehicles decreases.

In addition, ZEASZero-emission shuttles have few parts compared to the internal combustion engine shuttles and do not need an engine oil change. Through the use of ZEASzero-emission shuttles under the ZEASZero-Emission Airport Shuttle Regulation, the hazards associated with oil change and potential illegal dumping would be less as the demand for internal combustion vehicles decreases.

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could also result in increased installation of hydrogen fueling stations. Most retail hydrogen fueling stations would be located at existing gasoline stations, adjacent to or on the same

island as the gasoline dispenser. To accommodate the use of ~~ZEAS~~Zero-emission shuttles, new, stand-alone hydrogen fuel stations could be constructed and could qualify for a categorical exemption under CEQA (Arnold & Porter 2015). The hydrogen nozzles form an airtight connection with the FCEV fuel tank and are not physically similar to gasoline nozzles. Thus, the release of hydrogen during fueling would not be expected to occur. Further, hydrogen fuel stations and vehicle maintenance facilities are equipped with a hydrogen detector to detect hydrogen leaks.

There are inherent risks associated with the installation and use of hydrogen fuel cells including fire and explosion, electric shock, and exposure to toxic materials. Hydrogen possesses several hazardous properties such as a very wide flammability range, very low ignition energy, low viscosity, high diffusivity, and is chemically lighter than air (Health and Safety Executive, 2004). However, FCEB manufacturers developed and extensively safety-tested carbon-fiber hydrogen tanks, which can withstand environmental and man-made damage, including crash testing and ballistics. Hydrogen tanks are designed with multiple safety enhancements to prevent leaks in both routine use and extreme circumstances. Should a leak and subsequent ignition happen, the low radiant heat of a hydrogen fire and high diffusivity of hydrogen would reduce any potential damage, especially when compared to a gasoline fire.

Due to lithium-batteries and hydrogen fuel cell systems are designed to reduce the potential for hazardous conditions associated with transport, use, and disposal, and because regulations exist to ensure that lithium-ion batteries are managed properly, and disposed of appropriately, operational-related effects to hazards and hazardous materials associated with the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation would likely be less than significant. However, the potential remains for the release of hazardous materials into the environment.

As such, long-term operational-related effects associated with the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation to hazards and hazardous materials could be potentially significant.

Potential construction-related hazards and hazardous materials impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 9-2: Implement Mitigation Measure 9-1

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this EA takes the conservative

approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant short-term construction-related impacts and the long-term operational impacts regarding hazards and hazardous materials associated with the ZEASZero-Emission Airport Shuttle Regulation would be **potentially significant and unavoidable**.

10. Hydrology and Water Quality

Impact 10-1: Short-Term Construction-Related Effects on Hydrology and Water Quality

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of ZEASzero-emission shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support ZEASzero-emission shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of ZEASszero-emssion shuttles could results in a relatively small increase production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells; however, disposal would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new facilities or modifications to existing facilities could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is implemented at the time of normal bus purchase.

New facilities could be located in locations with a range of hydrologic conditions. For example, some places may be vulnerable to flooding and mudflow. Construction of buildings may exacerbate hydrologic hazards. For example, grading for building construction may alter drainage in a way that would increase potential flood risk on and around the project site. Grading and vegetation removal could also increase erosion, which could result in sedimentation in nearby waterways. Site leveling may also require fill of regulated water bodies. Precise impacts cannot be determined because specific construction details, siting locations, and associated hydrology and water quality conditions are not known at this time.

Construction activities could require disturbance of undeveloped areas, such as clearing of vegetation, earth movement and grading, trenching for utility lines, erection of new buildings, and paving of parking lots, delivery areas, and roadways. Specific construction projects would be required to comply with applicable erosion, water quality standards, and waste discharge requirements (e.g., NPDES, Stormwater Pollution Prevention Plan (SWPPP)).

Short-term construction-related effects to hydrologic resources associated with the ZEASZero-Emission Airport Shuttle Regulation could be potentially significant.

Potential construction-related hydrology and water quality impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 10-1

The Regulatory Setting in Appendix A includes, but is not limited to, applicable laws, regulations, and policies in regard to hydrology and water quality. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local discretionary land use and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with discretionary project-approval authority. Recognized practices that are routinely required to avoid and/or mitigate hydrology and water quality-related impacts include:

- Proponents of new or modified facilities constructed as a compliance response to the ZEASZero-Emission Airport Shuttle Regulation would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development.
- Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of actions required to mitigate potentially significant hydrology and water quality impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency. Implement Best Management Practices to reduce sedimentation and pollution of surface waters, such as installation of silt fencing around the perimeter of active construction areas.
- Train construction workers for proper response to hazardous materials spills as well as responsibilities for maintaining BMPs on site.
- Drainage plans for runoff shall be designed to contain adequate capacity for projected flows on site.
- Avoid filling of waters of the U.S. and waters of the State to the extent feasible. If activities require a WDR or Section 401 Water Quality Certification, comply with all avoidance, reduction, and compensatory measures.

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant short-term construction-related impacts related to hydrology and water quality associated with the ZEASZero-Emission Airport Shuttle Regulation would be **potentially significant and unavoidable**.

Impact 10-2: Long-Term Operational-Related Effects on Hydrology and Water Quality

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of ZEASzero-emission shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support ZEASzero-emission shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of ZEASszero-emssion shuttles could results in a relatively small increase production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells; however, disposal would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new facilities or modifications to existing facilities could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is implemented at the time of normal bus purchase.

The operation of new plants, stations, and modifications would be required to comply with applicable erosion, water quality standards, and waste discharge requirements (e.g., NPDES, SWPPP). Operation of these facilities would not require additional ground disturbance beyond that already disturbed during construction. With respect to depleting groundwater supplies, new facilities are not being anticipated to result in substantial demands due to the nature of associated activities.

Under the ZEASZero-Emission Airport Shuttle Regulation, ZEASzero-emission shuttles would be deployed to reduce air pollutant and GHG emissions from the transportation sector. As a result, fewer internal combustion shuttles would be in operation and demand for petroleum, diesel, and CNG would decrease. As such, it would be expected that oil and gas extraction activities could also decrease. Oil and gas extraction can produce substantial adverse effects to hydrology. For instance, fracking requires the use of millions of liters of water and consequently millions of liters of

wastewater, which can contaminate groundwater with toxic chemical compounds (European Parliament 2012). As on June 2015, U.S. EPA had identified 1,173 known chemicals used in the fracking industry (Environmental Health Perspectives, 2016). Additionally, accidental release of oil or gas and related wastewater (e.g., spills from pipelines or trucks, leakage from wastewater ponds or tanks) can introduce toxicants, radionuclides, and dissolved metals, and affect the salinity of local drinking water supplies (Environmental Health Perspectives 2016). Through implementation of the ZEASZero-Emission Airport Shuttle Regulation, the aforementioned effects to hydrologic resources would be reduced as ZEASzero-emission shuttles displace internal combustion-powered shuttles. As a result, adverse hydrologic effects associated with oil and gas extraction would be less.

Implementation of the ZEASZero-Emission Airport Shuttle Regulation would result in increased demand for lithium-ion batteries, which would accelerate the market for mined lithium. Mining of hard rock would require the use of conventional mining practices including the creation of underground mines and open pits, which would result in the removal of organic material (e.g., bedrock, vegetation). Additionally, lithium can be collected from continental brines found in basins. Salty groundwater is pumped into lagoons where it undergoes evaporation producing salts containing lithium compounds. This process could result in overdrafting of groundwater.

Extraction of lithium has substantial effects on water quality. Due to its high reactivity, lithium is found bound to other elements. To process lithium, toxic chemicals must be used which can cause water pollution through leaching and spills. Further, lithium mining from continental brines is a water-intensive process, which, as mining typically occurs in arid landscapes, could result in the depletion of available for water resources (Friends of the Earth 2013).

Mineral extraction and mining activities within the U.S. would be required to comply with the provisions of the Clean Water Act and the natural resource protection and land reclamation requirements of the appropriate State and federal land managers. For instance, the Bureau of Land Management (BLM) and U.S. Forest Service (USFS) mining permit conditions contain protections for hydrologic resources and require mining reclamation standards. However, lithium is obtained from areas outside of the U.S., where State and U.S laws and regulation are not enforced. Thus, water quality impacts related to mining could occur because of implementation of the reasonably foreseeable compliance responses associated with the ZEASZero-Emission Airport Shuttle Regulation.

As such, long-term operational-related effects to hydrology and water quality could be potentially significant.

This impact could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 10-2: Implement Mitigation Measure 10-1

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that long-term operational-related impacts to hydrology and water quality under the ZEASZero-Emission Airport Shuttle Regulation would be **potentially significant and unavoidable**.

11. Land Use Planning

Impact 11-1: Short-Term Construction-Related and Long-Term Operational-Related Effects on Land Use Planning

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of ZEASzero-emission shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support ZEASzero-emission shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of ZEASszero-emssion shuttles could result in a relatively small increase production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells; however, disposal would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new facilities or modifications to existing facilities could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is implemented at the time of normal bus purchase.

These would likely occur within existing footprints or in areas with consistent zoning or would undergo the appropriate process for a variance or conditional use. Additionally, constructed facilities would not be linear and are unlikely to be constructed in an area that would require displacing existing dissimilar uses (e.g., housing). Thus, implementation of the ZEASZero-Emission Airport Shuttle Regulation would not be anticipated to divide an established community or conflict with a land use policy.

Construction and operation of new manufacturing and recycling facilities may require the conversion of non-industrial land uses to industrial land uses. Potential environmental effects associated with land use change on agriculture and forestry,

biology, geology and soils, and hydrology and their related mitigation measures are discussed in further detail under their respective impact discussions.

12 Mineral Resources

Impact 12-1: Short-Term Construction-Related Effects on Mineral Resources

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of ZEASzero-emission shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support ZEASzero-emission shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of ZEASszero-emssion shuttles could results in a relatively small increase production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells; however, disposal would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new facilities or modifications to existing facilities could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is implemented at the time of normal bus purchase.

While buildings would likely be constructed within areas zoned for industrial uses, there is a possibility that buildings could be sited in locations identified as having viable mineral resources that are locally important or are of regional or state value. However, buildings would be limited in size such that they would not wholly preclude resource recovery from adjacent areas. For example, a manufacturing facility and surrounding parking area could occupy about 8 acres, which is unlikely to completely preclude mineral resource recovery from a specific deposit. As result, this impact would be **less than significant**.

Impact 12-2: Operational-Related Effects on Mineral Resources

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of ZEASzero-emission shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support ZEASzero-emission shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of ZEASszero-emssion shuttles could results in a relatively small increase production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells, which is required to be done in compliance with California law, including but not limited to the Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the

end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new facilities, or modifications to existing facilities, could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is based on changes at time of normal bus purchase.

The operation of new plants, stations, and modifications would be required to comply with applicable erosion, water quality standards, and waste discharge requirements (e.g., NPDES, SWPPP). Operation of these facilities would not require additional ground disturbance beyond that already disturbed during construction. With respect to depleting groundwater supplies, new facilities are not anticipated to result in substantial demands due to the nature of associated activities.

Long-term operational compliance responses associated with the ZEAS Zero-Emission Airport Shuttle Regulation include increased mining and processing of rare materials (e.g., lithium) used in fuel cells and EV batteries. Depending on the magnitude of required materials, implementation of the ZEAS Zero-Emission Airport Shuttle Regulation could affect the availability of known minerals.

The demand for additional mining to meet increased use of batteries could result in the development of new mines and mining of lithium. For the purposes of this document it would be too speculative to determine if, when, and where a new mine may be located. In the case that new mines are required, they would go through independent environmental review at the appropriate federal, state, or local level (see Attachment A for more information). It is assumed, for the purposes of this analysis that any new mines located within the U.S. or the state would be in areas with appropriate zoning, and subject to Federal, State, and/or local requirements.

Batteries used in ZEAS zero-emission airport shuttles are primarily lithium-based. Thus, it is assumed that mineral resource requirements associated with implementation of recommended measures in ZEAS Zero-Emission Airport Shuttle Regulation would be tied to lithium resources and other lithium-ion battery-related metals.

As of April 2018, the only two domestic lithium mines are in operation in the U.S. are brine operations in Nevada and rural California; however, in recent years, 6.9 million tons of new lithium resources have been identified in the U.S. in the form of continental brines, geothermal brines, hectorite, oilfield brines, and pegmatites. Two companies produced a large array of downstream lithium compounds in the U.S. from domestic or South American lithium carbonate, lithium chloride, and lithium hydroxide. Lithium consumption for batteries has increased substantially in recent years due to increased demand for rechargeable lithium batteries. Currently the U.S. imports most lithium from Chile (57 percent), Argentina (40 percent); China (2 percent); and others (1 percent) (USGS, 2017a). While lithium markets vary by location, end-use of lithium are estimated as follows: batteries (39 percent), ceramics and glass (30 percent), lubricating greases (8 percent), continuous casting mold flux powders and polymer production (5

percent each); air treatment (3 percent), and other uses (USGS, 2017a). Worldwide mine production and reserves are provided in Table 5 (USGS, 2017a).

Table 5: Lithium Mine Production and Reserves

Country	2015 (metric tons)	2016 (metric tons)	Reserves¹ (metric tons)
U.S.	N/A ²	N/A ²	38,000
Argentina	3,600	5,700	2,000,000
Australia	14,100	14,300	1,600,000
Brazil	200	200	48,000
Chile	10,500	12,000	7,500,000
China	2,000	2,000	3,200,000
Portugal	20	200	60,000
Zimbabwe	1900	900	23,000
World total (rounded)	31,500	35,000	14,000,000

Note:

¹ Reserves data are dynamic. They may be considered a working inventory of mining companies' supply of an economically extractable mineral commodity. Inventory is limited by many considerations, including cost of drilling, taxes, price of the mineral commodity being mined, and the demand for it.

² Metric tons of lithium ore from the U.S. is omitted to avoid disclosing company proprietary data.

Source: USGS, 2017a.

The magnitude of reserves, shown above, is necessarily limited by many considerations, including cost of drilling, taxes, price of the mineral commodity being mined and the associated demand. In addition to the reserves described above, deposits of mineral resources are also important to consider in assessing future supplies. Furthermore, owing to continuing exploration, identified lithium resources have increased substantially worldwide. For instance, lithium resources in the U.S. grew from 5.5 million metric tons in 2014 to 6.9 million metric tons in 2016. Worldwide, lithium resources are currently estimated to be approximately 40 million tons, including a collective 9 million metric tons in Bolivia and Argentina, 7.5 million metric tons in Chile, 2 million metric tons in Australia, 7 million metric tons in China, and 2 million metric tons in Canada. In addition, the Democratic Republic of the Congo, Russia, and Serbia have resources of approximately 1 million metric tons each. Further, due to steadily increasing demand for lithium, domestic recycling of lithium has also increased (USGS, 2017a).

~~ZEAS~~ zero-emission airport shuttles are not reliant on the use of the metal cobalt in their lithium-ion batteries. Rate of recycling lithium constituents could increase due to the purpose of recycling rare metal.

In 2016, one U.S. domestic company produced about 17,000 kilograms of platinum-group metals (PGMs) with an estimated value of about \$390 million from its two mines located in Montana (USGS, 2017b). The leading use of PGMs internationally is for catalytic converters to reduce global emissions of GHGs. Less-expensive palladium

has been substituted for platinum in low-emission catalytic converters (USGS, 2017b). Table 6 summarizes world platinum and palladium production and reserves.

Table 6: Platinum and Palladium Mine Production and Reserves

Country	Platinum		Palladium		Reserves ¹ (metric tons)
	2015 (metric tons)	2016 (metric tons)	2015 (metric tons)	2016 (metric tons)	
U.S.	3,670	3,900	12,500	13,200	900,000
Canada	7,600	9,000	21,000	23,000	310,000
Russia	22,000	23,000	81,000	82,000	1,100,000
South Africa	139,000	120,000	83,000	73,000	63,000,000
Zimbabwe	12,600	13,000	10,000	10,000	1,200,000
Other Countries	4,000	3,400	8,300	6,600	NA
World total (rounded)	189,000	172,000	216,000	208,000	67,000,000

Note:

¹ Reserves data are dynamic. They may be considered a working inventory of mining companies' supply of an economically extractable mineral commodity. Inventory is limited by many considerations, including cost of drilling, taxes, price of the mineral commodity being mined, and the demand for it. Source: USGS, 2017b.

It expected that introduction of more stringent emissions standards for automobiles worldwide could result in increased demand for platinum and palladium for use in catalytic converters. Currently, the U.S. imports platinum from South Africa (39 percent), Germany and the United Kingdom (13 percent each), Italy (7 percent), and other countries (28 percent). The U.S. also import palladium from South Africa (27 percent), Russia (24 percent), Italy (13 percent), the United Kingdom (8 percent), and other countries (28 percent) (USGS, 2017b).

Thus, long-term operational-related mineral resources effects associated with the ZEAS Zero-Emission Airport Shuttle Regulation could be potentially significant.

Potential long-term operational mineral impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies but is beyond the authority of CARB and not within its purview.

Mitigation Measure 12-1

The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies that provide protection of mineral resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would most likely qualify as a "project" under CEQA. The jurisdiction with primary discretionary approval authority over a proposed action is the Lead Agency, which is required to review the

proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation measures would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize impacts to mineral resources include:

- Proponents of construction activities implemented because of reasonably foreseeable compliance responses associated with the ZEASZero-Emission Airport Shuttle Regulation would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.
- Based on the results of the environmental review, proponents will implement all feasible mitigation to reduce or substantially lessen the potentially significant impacts on mineral resources associated with the project.
- Actions required to mitigate potentially significant mineral resource impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.
- Prior to the issuance of any development permits, proponents of new or modified facilities or infrastructure will prepare an investigation/study, which will include an evaluation of the development's impact on the availability of mineral resources valuable to the region and residents of the state or delineated on a local general plan, specific plan, or other land use plan.
- Proponents of new or modified facilities or infrastructure will provide a complete site plan showing any overlapping areas between the proposed plan and locally-important mineral resources delineated on a local general plan, specific plan, or other land use plan. Proponents will avoid locating facilities that would result in the loss of availability of locally-important mineral resources, as much as possible.

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this ~~Draft~~Final EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that long-term operational-related effects to mineral resources associated with the ZEASZero-Emission Airport Shuttle Regulation would be **potentially significant and unavoidable**.

13. Noise

Impact 13-1: Short-Term Construction-Related Noise Effects

Implementation of the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of ~~ZEAS~~zero-emission shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support ~~ZEAS~~zero-emission shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of ~~ZEAS~~zero-emission shuttles could result in a relatively small increase production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells; however, disposal would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new facilities or modifications to existing facilities could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is implemented at the time of normal bus purchase.

Construction and modification of buildings could involve activities such as earth moving, grading, demolition, and building construction. These activities would generate noise through the use of heavy equipment such as bulldozers, pile drivers, excavators, cranes, and vehicles. The effects of construction noise would vary and would largely depend on the type of construction activities occurring on any given day, noise levels generated by those activities, distances to noise sensitive receptors, whether the equipment is mobile or stationary, and the existing ambient noise environment in the receptor's vicinity because exterior ambient noise levels typically decrease during the late evening and nighttime hours as traffic volumes and commercial activities decrease, construction activities performed during these more noise-sensitive periods of the day can result in increased annoyance and potential sleep disruption for occupants of nearby residential uses.

The site preparation phase typically generates the most substantial noise levels because it requires the noisiest types of construction equipment. Although a detailed construction equipment list is not known, based on the anticipated compliance responses it is expected that the primary sources of noise would include backhoes, bulldozers, and excavators. Noise levels from typical types of construction equipment can range from approximately 74 to 94 A-weighted decibels (dBA) at 50 feet. Based on this information and accounting for typical usage characteristics of individual pieces of equipment and activity types, on-site construction could result in hourly average noise levels of 87 dBA equivalent level measurements (L_{eq}) at 50 feet and maximum noise levels of 90 dBA maximum sound level (L_{max}) at 50 feet from the simultaneous operation of heavy-duty equipment. Based on these and general attenuation rates, exterior noise levels at noise-sensitive receptors located within thousands of feet from project sites

could exceed typical local noise standards (e.g., 50/60 dBA L_{eq}/L_{max} during the daytime hours and 40/50 dBA L_{eq}/L_{max} during the nighttime hours).

Additionally, construction activities may result in varying degrees of temporary groundborne noise and vibration, depending on the specific construction equipment used and activities involved. Groundborne noise and vibration levels caused by various types of construction equipment and activities (e.g., bulldozers, blasting) range from 58-109 vibration decibels (VdB) and from 0.003 to 0.089 inches per second (in/sec) peak particle velocity (PPV) at 25 feet. Similar to the above discussion, although a detailed construction equipment list is not currently available, based on this project type it is expected that the primary sources of groundborne vibration and noise would include bulldozers and trucks. According to the Federal Transit Administration (FTA), levels associated with the use of a large bulldozer and trucks are 0.089 and 0.076 in/sec PPV (87 and 86 VdB), respectively, at 25 feet. With respect to the prevention of structural damage, construction-related activities would not exceed recommended levels (e.g., 0.2 in/sec PPV). However, based on FTA's recommended procedure for applying a propagation adjustment to these reference levels, bulldozing and truck activities could exceed recommended levels with respect to the prevention of human disturbance (e.g., 80 VdB) within 275 feet. Thus, implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in the generation of short-term construction noise levels in excess of applicable standards or that result in a substantial increase in ambient levels at nearby sensitive receptors, and exposure to excessive vibration levels.

Short-term construction-related effects on noise associated with the ZEASZero-Emission Airport Shuttle Regulation could be potentially significant.

Potential construction-related noise impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 13-1

The Regulatory Setting in Appendix A includes, but is not limited to, applicable laws, regulations, and policies that pertain to noise. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local discretionary land use and/or permitting authority. New or modified facilities in California would qualify as a "project" under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with discretionary project-approval authority. Recognized practices that are routinely required to avoid and/or minimize noise include:

- Proponents of new or modified facilities constructed as a compliance response to the ZEASZero-Emission Airport Shuttle Regulation would coordinate with local land use agencies to seek entitlements for development including the completion

of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development.

- Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of actions required to mitigate potentially significant noise impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.
- Ensure noise-generating construction activities (including truck deliveries, pile driving and blasting) are limited to the least noise-sensitive times of day (e.g., weekdays during the daytime hours) for projects near sensitive receptors.
- Consider use of noise barriers, such as berms, to limit ambient noise at property lines, especially where sensitive receptors may be present.
- Ensure all project equipment has sound-control devices no less effective than those provided on the original equipment.
- All construction equipment used would be adequately muffled and maintained.
- Ensure all stationary construction equipment (i.e., compressors and generators) is located as far as practicable from nearby sensitive receptors or shielded.
- Properly maintain mufflers, brakes and all loose items on construction and operational-related vehicles to minimize noise and ensure safe operations. Keep truck operations to the quietest operating speeds. Advise about downshifting and vehicle operations in sensitive communities to keep truck noise to a minimum.
- Use noise controls on standard construction equipment; shield impact tools.
- Consider use of flashing lights instead of audible back-up alarms on mobile equipment.
- Install mufflers on air coolers and exhaust stacks of all diesel and gas-driven engines.

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant short-term construction-related

noise impacts associated with the ZEASZero-Emission Airport Shuttle Regulation would be **potentially significant and unavoidable**.

Impact 13-2: Long-Term Operational-Related Effects on Noise

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of ZEASzero-emission shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support ZEASzero-emission shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of ZEASszero-emission shuttles could result in a relatively small increase production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells; however, disposal would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new facilities or modifications to existing facilities could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is implemented at the time of normal bus purchase.

The ZEASZero-Emission Airport Shuttle Regulation would increase ZEASszero-emission airport shuttles in operation and would decrease diesel, natural gas, or gasoline combustion shuttles in operation. Testing has demonstrated that battery electric buses are, on average, quieter than internal combustion buses. Altoona testing of a representative battery electric bus, the BYD BEB, found exterior operational noise levels of roughly 60 dB(A) during acceleration (Altoona Bus Research and Testing Center, 2014); by comparison, the New Flyer D40LF diesel bus generated 77.7 dB(A) of exterior noise (Altoona Bus Research and Testing Center, 1995), and the New Flyer C40LF CNG powered bus generated 71.8 dB(A) of exterior noise (Altoona Bus Research and Testing Center, 2012). Operation of ZEBs would therefore result in a net decrease in traffic noise levels where ZEBs are deployed, such as areas with transit and airports that use shuttle buses.

Deployment of ZEASzero-emission shuttles could indirectly decrease oil and gas extraction activities, which requires the use of heavy-duty mechanical equipment (e.g., drills, dozers, explosives). These pieces of equipment generate levels of noise that could potentially adversely affect ambient noise levels near sensitive receptors or to biological resources (see Impact 4-2, "Long-Term Operational-Related Effects to Biological Resources). Under the ZEASZero-Emission Airport Shuttle Regulation, oil and gas extraction activity and related noise could be reduced as demand for petroleum, diesel, and CNG decreases.

Operational-related activities associated with lithium mining could produce substantial stationary sources of noise. Mechanical equipment (e.g., dozers) required to excavate

bedrock and vegetation would generate noise that could be considered adverse to sensitive receptors; however, it would be expected that expansion of existing mines would not involve sensitive receptors given that mines typically are in areas zoned industrial. Also, it would be anticipated that new lithium mines constructed as a compliance response to the ZEASZero-Emission Airport Shuttle Regulation within the U.S. or state would be in areas of consistent zoning and therefore not in close proximity to sensitive receptors

New sources of noise associated with implementation of ZEASZero-Emission Airport Shuttle Regulation could include operation of manufacturing plants and recycling facilities. Manufacturing and recycling activity could include on-site noise sources, including fuel-delivery and other hauling-related activities (e.g., truck unloading), fuel-handling and processing activities (e.g., conveyor system, wheeled loader, dozer), and mechanical equipment (e.g., boiler, turbine, fans, pumps). Depending on the proximity to existing noise-sensitive receptors, stationary source noise levels could exceed applicable noise standards and result in a substantial increase in ambient noise levels.

Long-term operational noise effects associated with the ZEASZero-Emission Airport Shuttle Regulation could be potentially significant.

Potential long-term operational noise impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 13-2

The Regulatory Setting in Appendix A includes, but is not limited to, applicable laws, regulations, and policies that pertain to noise. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local discretionary land use and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with discretionary project-approval authority. Recognized practices that are routinely required to avoid and/or minimize noise include:

- Proponents of new or modified facilities constructed as a compliance response to the ZEASZero-Emission Airport Shuttle Regulation would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development.
- Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially

lessen the environmental impacts of the project. The definition of actions required to mitigate potentially significant noise impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency

- Equip all emergency pressure relief valves and steam blow-down lines with silencers to limit noise levels.
- Contain facilities within buildings or other types of effective noise enclosures.
- Employ engineering controls, including sound-insulated equipment and control rooms, to reduce the average noise level in normal work areas.

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that long-term operational noise effects associated with the ZEASZero-Emission Airport Shuttle Regulation would be **potentially significant and unavoidable**

14. Population and Housing

Impact 14-1: Short-Term Construction-Related and Long-Term Operational-Related Effects on Population and Housing

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of ZEASzero-emission shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support ZEASzero-emission shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of ZEASzero-emission shuttles could result in a relatively small increase production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells; however, disposal would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new facilities or modifications to existing facilities could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is implemented at the time of normal bus purchase.

Construction and modification activities would be anticipated to require minimal if any crew relocation because manufacturing facilities are frequently constructed and the demand for crews would be temporary (e.g., 6 to 12 months per project). Furthermore, it would not be anticipated that a substantial amount of new personnel would be needed to operate the facilities and that sufficient employment base would likely be available. For example, Proterra plans to open a new zero-emission bus manufacturing facility planned to employ a total of more than 100 people at a 157,000 square foot facility in Los Angeles County by the end of 2018 (Proterra, 2018). Though new plants are (being) built in California for ZEB manufacturing, there is not likely to be new employee relocation. For example, BYD, located in Lancaster, California, has a community benefits agreement (CBA) with Jobs to Move America (JMA), which will support the creation of a robust U.S. jobs program through deep investments in pre-apprenticeship and training programs. This CBA has a goal of recruiting and hiring 40 percent of its workers from populations facing significant barriers to employment, such as veterans and returning citizens (Charged Electric Vehicles Magazine, 2017). In addition, populations that have historically been excluded from the manufacturing industry are also expected to be recruited and placed. The agreement also includes commitments from BYD to work with the JMA coalition to provide support systems for these workers to strengthen retention efforts, such as providing transportation for workers who may not have access to a car. It is reasonable to anticipate these (potential) workers are local and are not likely to migrate from other places.

Therefore, there would be minimal if any relocation and it is likely that there will be sufficient housing for any relocated employees. Therefore, this impact would be **less than significant**.

15. Public Services

Impact 15-1: Short-Term Construction-Related and Long-Term Operational-Related Effects on Public Services

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of ZEASzero-emission shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support ZEASzero-emission shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of ZEASszero-emssion shuttles could results in a relatively small increase production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells; however, disposal would need to be in compliance with California law, including but not limited to the Hazardous Waste Control Law and implementing regulations. Improper management or unsafe disposal of lithium-ion batteries could cause adverse environmental hazards and be a concern of public safety; however, when packaged and handled properly, lithium-ion batteries could pose no environmental hazard (79 Fed. Reg. 46011, 46032) and therefore no increased demand on public services related to fire protection is anticipated. For lithium-ion batteries, it is

anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new facilities, or modifications to existing facilities, could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is based on changes at time of normal bus purchase.

As discussed for in “Population and Housing,” minimal or no relocation of employees would occur during construction or operation. Increased operation of manufacturing facilities may increase the need for emergency services in the case of accidents. Compliance with Occupational Safety and Health Administration safety regulations and local fire departments would minimize the risk of accidents. Therefore, construction of individual manufacturing facilities is not anticipated to require provision of additional facilities for public services. As a result, this impact would be **less than significant**.

16. Recreation

Impact 16-1: Short-Term Construction-Related and Long-Term Operational-Related Effects on Recreation

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of ZEASzero-emission shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support ZEASzero-emission shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of ZEASszero-emssion shuttles could results in a relatively small increase production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells; however, disposal would need to comply with California law, including but not limited to California’s Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new facilities or modifications to existing facilities could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is implemented at the time of normal bus purchase.

As discussed for in “Population and Housing,” minimal or no relocation of employees would occur during construction or operation. Therefore, only minimal increases in use of parks and other recreational facilities may occur. Construction of new or expanded recreational facilities would not be affected. As a result, this impact would be **less than significant**.

17. Transportation/Traffic

Impact 17-1: Short-Term Construction-Related Effects on Transportation and Traffic

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of ZEASzero-emission shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support ZEASzero-emission shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of ZEASszero-emssion shuttles could results in a relatively small increase production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells; however, disposal would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new facilities or modifications to existing facilities could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is implemented at the time of normal bus purchase.

Construction of new facilities and modifications to existing facilities would result in short-term construction traffic (primarily motorized) in the form of worker commute- and material delivery-related trips. The amount of construction activity would fluctuate depending on the particular type, number, and duration of usage for the varying equipment, and the phase of construction. These variations would affect the amount of project-generated traffic for both worker commute trips and material deliveries. Depending on the amount of trip generation and the location of new facilities, implementation could conflict with applicable programs, plans, ordinances, or policies (e.g., performance standards, congestion management); and/or result in hazardous design features and emergency access issues from road closures, detours, and obstruction of emergency vehicle movement, especially due to project-generated heavy-duty truck trips.

As such, short-term construction-related impacts to transportation and traffic associated with the ZEASZero-Emission Airport Shuttle Regulation could be potentially significant.

Potential construction-related traffic and transportation impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 17-1

The Regulatory Setting in Appendix A includes, but is not limited to, applicable laws, regulations, and policies related to transportation. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the

purview of jurisdictions with discretionary land use and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with discretionary project-approval authority. Recognized practices that are routinely required to avoid and/or minimize construction traffic impacts include:

- Proponents of new or modified facilities constructed as a compliance response to the ZEAS Zero-Emission Airport Shuttle Regulation would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development.
- Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of actions required to mitigate potentially significant traffic impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.
- Minimize the number and length of access, internal, service and maintenance roads and use existing roads when feasible.
- Provide for safe ingress and egress to/from the proposed project site. Utilize flaggers where necessary to control traffic at site entrances during construction.
- Prepare a Construction Traffic Control Plan and a Traffic Management Plan.
- Encourage carpooling to the site.
- Avoid materials deliveries during peak traffic periods.

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant short-term construction-related transportation and traffic impacts associated with the ZEAS Zero-Emission Airport Shuttle Regulation could be **potentially significant and unavoidable**.

Impact 17-2: Long-Term Operational-Related Effects on Transportation and Traffic

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of ZEASzero-emission shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support ZEASzero-emission shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of ZEASszero-emssion shuttles could results in a relatively small increase production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells; however, disposal would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new facilities or modifications to existing facilities could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is implemented at the time of normal bus purchase.

Implementation of the ZEASZero-Emission Airport Shuttle Regulation would result in increased deployment of ZEASszero-emission airport shuttles as well as infrastructure to support their use, including charging and hydrogen fueling stations. FCEB fueling stations and the majority of BEB charging stations would be at the current transit depots and create no additional transportation and traffic impact. On-route charging infrastructure is normally built at the transportation hub which should not increase VMT or have adverse impact on traffic.

Increased use of ZEASzero-emission shuttles under the ZEASZero-Emission Airport Shuttle Regulation could reduce the magnitude of oil and gas extraction as use of petroleum, diesel, and CNG concurrently decrease. Operational-related transportation of raw oil and gas to refineries as well as the transport of refined oil and gas products could subsequently decrease; however, deployment of FCEBs could increase the production of hydrogen fuel, the distribution of which could introduce VMT to new areas. It would not be anticipated that the increase in hydrogen fuel production and demand attributed to the implementation of the ZEASZero-Emission Airport Shuttle Regulation would be substantial, however.

These compliance responses could include construction and operation of new or modified manufacturing plants to support ZEASzero-emission shuttles and related technology, recycling centers for disposal or repurposing of high-emission equipment and spent batteries, and new or expanded mining operations in the State, the U.S., and globally. With respect to operational activities, it would not be anticipated that substantial amount of new personnel would be needed to operate new facilities such that a sufficient employment base would be available because these facilities would occur within areas of consistent zoning. In addition, deliveries associated with long-

term operational-related activities would not be anticipated to result in a substantial number of new trips, such that roadway service levels would be substantially affected.

However, construction of new manufacturing and recycling facilities may affect local roadways. It is conceivable that the operation of new or modified manufacturing facilities could result in expanded supply and transport of ZEAS zero-emission shuttles and technologies beyond existing baseline levels. For instance, workers and businesses associated with expanded or new recycling centers and battery manufacturing facilities could increase VMT levels on nearby roadways. In addition, new or expanded mining operations, both within the U.S. and internationally, could generate additional VMT, or increase cargo ship activity, as lithium ore is traded and distributed on a global scale. However, it is conceivable that such operations would displace existing levels of VMT associated with oil and gas extraction, production, and transportation.

New facilities may result in additional egress/ingress points or increased traffic that would result in hazardous conditions on local roadways. Inadequate access may impede emergency vehicle access to new facilities. New facilities would require staff during operations, which would add trips to the new facilities. Pursuant to SB 375, CARB established GHG reduction targets for metropolitan planning organizations that range from 13 to 16 percent by 2035. These are based on land use patterns and transportation systems specified in Regional Transportation Plans and Sustainable Community Strategies. Locations of facilities cannot currently be known; therefore, the total change in VMT cannot be assessed. Therefore, it is possible that a compliance response may maintain, increase, or insufficiently reduce VMT considering the general goal of reducing VMT over the long-term.

As a result, long-term operational-related impacts associated with the ZEAS Zero-Emission Airport Shuttle Regulation could be potentially significant.

Potential construction-related traffic and transportation impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 17-2

The Regulatory Setting in Appendix A includes, but is not limited to, applicable laws, regulations, and policies related to transportation. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with discretionary land use and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with discretionary project-approval authority. Recognized practices that are routinely required to avoid and/or minimize construction traffic impacts include:

- Identify and implement road and intersection design requirements or improvements for any proposed or significantly impact roads and intersections.
- Consult with and implement recommendations from local fire protection services regarding emergency access requirements.
- Encourage alternative transportation and carpooling to the project site.

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that long-term operational-related effects to transportation and traffic associated with the ZEASZero-Emission Airport Shuttle Regulation would be **potentially significant and unavoidable**.

18. Utilities and Service Systems

Utilities and Service Systems impacts are inherently long-term and related to the operational facilities; thus, short-term construction-related impacts are not discussed below.

Impact 18-1: Long-Term Operational-Related Effects on Utilities and Service Systems

Implementation of the ZEASZero-Emission Airport Shuttle Regulation could result in an increase in manufacturing and associated facilities to increase the supply of ZEASzero-emission shuttles, along with construction of new hydrogen fueling stations and electric vehicle charging stations to support ZEASzero-emission shuttle operations and associated increase in hydrogen fuel supply and transportation. Increased deployment of ZEASszero-emssion shuttles could results in a relatively small increase production of electricity and hydrogen fuel, reduce rates of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states. This could result in increased rates of disposal of lithium batteries and hydrogen fuel cells; however, disposal would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. For lithium-ion batteries, it is anticipated they still have a useful life at the end of bus life, and are likely to be repurposed for a second life. To meet an increased demand of refurbishing or reusing batteries and fuel cells, new facilities or modifications to existing facilities could be constructed to accommodate recycling activities. Fleet turnover largely would be unaffected since the regulation is implemented at the time of normal bus purchase.

New hydrogen fueling stations would likely be located within the properties of transit agencies in urban areas consistent with local zoning. These locations would likely be served by utility and service systems that are already in place at the time the stations are built. Such systems would include water supply service providers, centralized wastewater treatment systems, storm water drainage infrastructure, and solid waste service providers and related infrastructure. For these reasons, demand for these utilities and services would not be expected to exceed the capacity of the local providers or necessitate an increase in service capacities and associated infrastructure and, therefore, would not result in associated environmental impacts.

New manufacturing plants and recycling facilities, however, could generate substantial increases in the demand for water supply, wastewater treatment, storm water drainage, energy, and solid waste services in their local areas. Additionally, depending on the location, new facilities may require new utility service lines and connections. At this time, the specific location, type, and number of new manufacturing plants developed is not known and would be dependent upon a variety of market factors that are not within the control of CARB including: economic costs, product demands, and environmental constraints. Therefore, the ultimate magnitude and location of demand for utilities such as water and wastewater cannot be known. Thus, the specific impacts from new manufacturing plants and recycling facilities on utility and service systems cannot be identified with any certainty, and individual plants could potentially result in significant environmental impacts related to procurement and delivery of utilities and public services.

Implementation of the ZEASZero-Emission Airport Shuttle Regulation would increase the number of ZEASzero-emission airport shuttles on the road, which would divert energy demand from the direct burning of fossil fuels to the electricity grid. As discussed under Impact 6-2, “Long-Term Operational-Related Effects to Energy,” public utility companies would continue to improve infrastructure and implement strategies to diversify the grid to accommodate additional electricity demand from use of ZEVs including ZEASzero-emission airport shuttles.

Any new or modified facilities, no matter their size and location would be required to seek local or State land use approvals prior to their development. In addition, part of the land use entitlement process for facilities proposed in California requires that each of these projects undergo environmental review consistent with the requirements of CEQA and the CEQA Guidelines. It is assumed that facilities proposed in other states would be subject to comparable federal, State, and/or local environmental review requirements (e.g., CEQA) and that the environmental review process would assess whether adequate utilities and services (i.e., wastewater services, water supply services, solid waste facilities) would be available and whether the project would result in the need to expand or construct new facilities to serve the project. Through the environmental review process, utility and service demands would be calculated; agencies would provide input on available service capacity and the potential need for service-related infrastructure including expansions to waste water treatment plants, new water supply entitlements and infrastructure, storm water infrastructure, and solid waste handling capacity (e.g.,

landfills). Resulting environmental impacts would also be determined through this process.

At this time, the specific location and type of construction needed is not known and would be dependent upon a variety of market factors that are not within the control of CARB including: economic costs, product demands, environmental constraints, and other market constraints. Thus, the specific impacts from construction on utility and service systems cannot be identified with any certainty, and individual compliance responses could potentially result in significant environmental impacts for which it is unknown whether mitigation would be available to reduce the impacts.

Thus, long-term operational-related effects to utilities and services systems, associated with the ZEAS Zero-Emission Airport Shuttle Regulation could be potentially significant.

Potential long-term operational-related utilities and service systems impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Mitigation Measure 18-1

The Regulatory Setting in Appendix A includes, but is not limited to, applicable laws, regulations, and policies related to utilities and service systems. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be subject to approval by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with discretionary land use and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with discretionary project-approval authority. Recognized practices that are routinely required to avoid and/or minimize utility and service-related impacts include:

- Proponents of new or modified facilities constructed as a compliance response to the ZEAS Zero-Emission Airport Shuttle Regulation would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development.
- Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of actions required to mitigate potentially significant utility or service-related impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.

- Comply with local plans and policies regarding the provision of water supply, wastewater treatment, and storm water drainage utilities, and solid waste services.
- Where an on-site wastewater system is proposed, submit a permit application to the appropriate local jurisdiction and include the application with applications to appropriate lead agencies.
- Where appropriate, prepare a Water Supply Assessment (WSA) consistent with the requirements of Section 21151.9 of the Public Resources Code/ Section 10910 et seq. of the Water Code. The WSA would be approved by the local water agency/purveyor prior construction of the project.
- Comply with local plans and policies regarding the provision of wastewater treatment services.

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, long-term operational-related effect to utilities and service systems associated with the ZEAS Zero-Emission Airport Shuttle Regulation would be **potentially significant and unavoidable**.

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5.0 CUMULATIVE AND GROWTH-INDUCING IMPACTS

A. Approach to Cumulative Analysis

This section satisfies requirements of the California Environmental Quality Act (CEQA) to discuss how the project being analyzed would contribute to cumulative impacts. CARB's certified regulatory program (17 California Code of Regulations (CCR). Sections 60000–60008) does not provide specific direction on a cumulative impacts analysis, and while CARB is exempt from Chapters 3 and 4 of CEQA and corresponding sections of the CEQA Guidelines by virtue of its certified program, the Guidelines nevertheless contain useful guidance for preparation of a thorough and meaningful cumulative analysis. The CEQA Guidelines require a lead agency to discuss a cumulative impact if the project's incremental effect combined with the effects of other projects is "cumulatively considerable" (CEQA Guidelines Section 15130(a)). The discussion of cumulative impacts need not provide as much detail as the discussion of effects attributable to the project alone (CEQA Guidelines Section 15130). Where a lead agency is examining a project with an incremental effect that is not "cumulatively considerable," a lead agency need not consider that effect significant but must briefly describe its basis for concluding that the incremental effect is not cumulatively considerable.

In considering cumulative impacts, an agency may choose from two approaches: it can prepare a list of past, present, and probable future projects that will produce related or cumulative impacts; or, it can rely on a summary of projections contained in an adopted planning document or an adopted or certified environmental document for the planning document (CEQA Guidelines Section 15130(b)). Further, the CEQA Guidelines state that the pertinent discussion of cumulative impacts contained in one or more previously certified environmental impact reports (EIRs) may be incorporated by reference pursuant to provisions for tiering and program EIRs, and that no future cumulative analysis is required when the lead agency determines the regional and area wide impacts have already been addressed in the prior certified EIR for that plan (CEQA Guidelines Section 15130).

For purposes of this analysis, CARB is relying on the summary of projections contained in the EA prepared for the Statewide State Implementation Plan Strategy (SIP Strategy EA). The State SIP Strategy EA provided a programmatic review of significant adverse impacts associated with the reasonably foreseeable compliance responses that appeared most likely to occur because of implementing the recommended actions identified and discussed in the State SIP Strategy. The impact discussion includes, where relevant, construction-related effects, operational effects of new or modified facilities, and influences of the recommended actions on criteria and other air pollutant emissions. The State SIP Strategy EA considered cumulative impacts of a full range of reasonably foreseeable compliance responses to all the recommendations, including the ZEAS Zero-Emission Airport Shuttle Regulation within the On-Road Heavy-Duty Vehicles Sector, along with the expected background growth in California in its impacts conclusions for each resource topic area. That EA considered the cumulative effect of other "closely related" past, present, and future reasonably foreseeable activities

undertaken to reduce criteria and other air pollutant emissions in response to statewide programs and policies, as well as other activities with “related impacts” (CEQA Guidelines Sections §§ 15355(b), 15130(a)(1)). Note that the cumulative impact analysis need not consider impacts to which the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation would not contribute or impacts of the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation that are beneficial.

CEQA Guidelines (14 CCR Section 15000 et. seq.) state that a previously approved plan may be used in cumulative impacts analysis; the pertinent discussion of cumulative impacts contained in one or more previously certified EIR(s) may be incorporated by reference; and in certain circumstances, no further cumulative impact analysis is required for a project that is consistent with a plan that has a certified EIR (14 CCR Section 15130 (d)). The related plans and programs considered for cumulative impacts of the proposed Draft Blueprint include the State SIP Strategy and the Scoping Plan.

CEQA Guidelines allow for incorporating by reference all or portions of other documents. Incorporation by reference is useful for including long, descriptive, or technical materials that provide general background but do not contribute directly to the pertinent analysis (14 CCR Section 15150). Therefore, the following document is incorporated by reference.

- Final EA for the State SIP Strategy (CARB, 2017a)

The portions of these documents relevant to this discussion are summarized below and within the respective resource area analyses. These documents are available upon request from CARB.

1. State SIP Strategy

Under the federal Clean Air Act (CAA), CARB and local air districts are responsible for developing and submitting to the U.S. Environmental Protection Agency (U.S. EPA) clean air plans, known as SIPs. (See CAA, Section 110; 42 U.S.C. Section 7410.) SIPs are comprehensive plans that demonstrate how and when nonattainment areas within California would reach attainment of air quality standards. SIPs must identify both the magnitude of emission reductions needed and the actions necessary to achieve those reductions by the required attainment deadline.

Developing the SIPs is an immediate focus of CARB’s planning efforts, with regional plans for ozone nonattainment areas due in July 2016 and fine particulate matter (PM_{2.5}) nonattainment areas in October 2016. Substantial emission reductions beyond those being achieved with current programs are needed to meet these standards. In addition to the most recent air quality standards, the South Coast and San Joaquin Valley must also continue to progress towards attaining earlier standards, which they have not yet achieved, including the 8-hour ozone standard of 80 parts per billion (ppb), and the 24-hour PM_{2.5} standard of 35 micrograms per cubic meter.

CARB released the draft State SIP Strategy and Draft EA for public review on May 17, 2016. The public comment period for the draft State SIP Strategy and Draft EA was from May 17, 2016 through July 18, 2016. CARB prepared written responses to comments received on the Draft EA and made revisions as necessary. On March 7, 2017, CARB released the Revised Proposed 2016 State SIP Strategy and in March 2017, the Board adopted the State SIP Strategy.

Reasonably foreseeable compliance responses associated with the State SIP Strategy include: increased infrastructure for natural gas and hydrogen refueling stations, increased demand for lithium battery manufacturing and associated increases in lithium mining and exports, increased recycling or refurbishment of lithium batteries, and increased emission testing of vehicles. It is anticipated that the replacement rate of off-road and on-road vehicles would be increased, requiring that older models are sold outside of California or recycled. These compliance responses could include construction and operation of new manufacturing facilities to support zero-emission technologies and increased manufacturing of low NO_x engines. Finally, implementation of a Low Emission Diesel (LED) standard is anticipated to increase consumption of LED fuels, including renewable hydrocarbon diesel (more commonly known as renewable diesel) from feedstocks such as oil seeds and tallow; and/or compressed or liquefied renewable LED fuels from gas to liquid processing of biomethane or forest residues. In addition, infrastructure to support collection, processing, and distribution of biomethane may be required.

No changes to the physical environment were anticipated that could result in adverse environmental effects for compliance responses associated with consumer products, as these could result in regulatory actions to limit volatile organic compound (VOC) emission from consumer products. This may change the types of chemicals currently used; however, evaluation would occur on a case-by-case basis as data reporting and review must first be completed to determine which products may be subject to VOC reduction measures.

In addition, the State SIP Strategy includes petitioning the U.S. Environmental Protection Agency (U.S. EPA) for various regulatory changes, such as federal low NO_x emission standards for heavy-duty engines, and for the development of new Tier 5 national locomotive emission standards. These actions involve federal (U.S. EPA) rulemaking and are not subject to CARB consideration. It would therefore be speculative for this EA to attempt to analyze the impacts of potential compliance responses associated with measures that are subject to U.S. EPA development and review. Note that if U.S. EPA undertakes these federal rulemaking actions, it would complete the appropriate environmental analysis at the federal level.

Reductions in criteria air pollutants throughout the state could result from the use of ZEVs, intelligent transportation systems, sustainable community strategies, and roadway modifications. However, the State SIP Strategy would not be driving these action, and they would be implemented through other programs. Thus, they are not considered to be reasonably foreseeable compliance responses related to

implementation of the State SIP Strategy and environmental impacts related to these activities was not discussed in the SIP EA.

Potential environmental impacts associated with the State SIP Strategy are summarized below in Table 7.

Table 7: Summary of Environmental Impacts for the State SIP Strategy

Resource Area Impact Significance Before Mitigation	Significance After Mitigation
Aesthetics	
Impact 1-1: Short-Term Construction-Related and Long-Term Operational Impacts on Aesthetics	PSU
Agriculture Resources	
Impact 2-1: Short-Term Construction-Related and Long-Term Operational-Related Effects to Agricultural and Forest Resources	PSU
Air Quality	
Impact 3-1: Short-Term Construction-Related Effects to Air Quality	PSU
Impact 3-2: Long-Term Operational-Related Effects to Air Quality	B
Biological Resources	
Impact 4-1: Short-Term Construction-Related Effects to Biological Resources	PSU
Impact 4-2: Long-Term Operational-Related Effects to Biological Resources	PSU
Cultural Resources	
Impact 5-1: Short-Term Construction-Related and Long-Term Operational Effects to Cultural Resources	PSU
Energy Demand	
Impact 6-1: Short Term Construction-Related Impacts on Energy Demand	LTS
Impact 6-2: Long-Term Operational Impacts on Energy Demand	B
Geology, Soils and Minerals	
Impact 7-1: Short-Term Construction-Related and Long-Term Operational Effects on Geology, Seismicity, and Soils	PSU
Greenhouse Gas Emissions	
Impact 8-1: Short-Term Construction-Related and Long-Term Operational Greenhouse Gas Impacts	B
Hazards and Hazardous Materials	
Impact 9-1: Short-Term Construction-Related Hazard Impacts	PSU
Impact 9-2: Long-Term Increased Transport, Use, and Disposal of Hazardous Materials	LTS
Hydrology and Water Quality	
Impact 10-1: Short-Term Construction-Related Hydrologic Resource Impacts	PSU

Table 7: Summary of Environmental Impacts for the State SIP Strategy

Resource Area Impact Significance Before Mitigation	Significance After Mitigation
Impact 10-2: Long-Term Effects on Hydrology and Water Quality Related to Changes in Land Use	PSU
Land Use and Planning	
Short-Term Construction-Related and Long-Term Operational Impacts on Land Use and Planning	LTS
Mineral Resources	
Impact 12-1: Short-Term Construction-Related Impacts on Mineral Resource	LTS
Impact 12-2: Long-Term Operational Impacts on Mineral Resources	LTS
Noise	
Impact 13-1: Short-Term Construction-Related Noise Impacts	PSU
Impact 13-2: Long-Term Operational Noise Impacts	PSU
Impact 14-1: Short-Term Construction-Related and Long-Term Operational-Related Effects to Population and Housing	LTS
Impact 15-1: Short-Term Construction-Related and Long-Term Operational-Related Effects to Public Services	LTS
Impact 16-1: Short-Term Construction-Related and Long-Term Operational-Related Effects to Recreation	LTS
Transportation and Traffic	
Impact 17-1: Short-Term Construction-Related Impacts on Traffic and Transportation	PSU
Impact 17-2: Long-Term Operational Impacts on Traffic and Transportation	PSU
Utilities and Service Systems	
Impact 18-1: Short-Term Construction Related and Long-Term Operational Impacts on Utilities and Service Systems	PSU
Notes: B = beneficial, LTS = less-than-significant, PSU = potentially significant and unavoidable after mitigation Source: CARB 2017a.	

B. Significance Determinations and Mitigation

Implementation of the ZEASZero-Emission Airport Shuttle Regulation was determined to potentially result in cumulatively considerable contributions to significant cumulative impacts to certain resource areas, as discussed below. As is the case for project impacts described in Chapter 4, while suggested mitigation is provided for each potentially cumulatively considerable impact, imposition of mitigation is outside CARB's authority, and any mitigation would instead need to be imposed by other agencies. Where impacts may not be feasibly mitigated, the EA takes a conservative approach and recognizes the impact as significant and unavoidable. The Board will need to adopt

Findings and a Statement of Overriding Considerations for any significant and unavoidable environmental effects of the project as part of the approval process for the ZEASZero-Emission Airport Shuttle Regulation.

C. Cumulative Impacts by Resource Area

1. Aesthetics

The State SIP Strategy EA found that implementation of the recommended actions, which included the recommendation for the ZEASZero-Emission Airport Shuttle Regulation, could result in impacts to aesthetic resources. As discussed in the State SIP Strategy EA, there is uncertainty as to the exact location of these new facilities or the modification of existing facilities. Construction and operation of these facilities (although likely to occur in areas zoned or used for manufacturing or industrial purposes that could contain visually similar facilities), could conceivably introduce or increase the presence of artificial elements (e.g., heavy-duty equipment, removal of existing vegetation, buildings) in areas of scenic importance, such as areas visible from a State scenic highways. The visual impact of such development would depend on several variables, including the type and size of facilities, distance and angle of view, visual absorption, and facility placement in the landscape. In addition, facility operation may introduce substantial sources of glare, exhaust plumes, and nighttime glare from lighting for safety and security. Implementation of mitigation measures would not necessarily reduce these impacts to a less-than-significant level because the ability to determine project-level impacts and impose project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the recommended actions in the State SIP Strategy could result in a significant cumulative aesthetics-related impact.

The contribution of the ZEASZero-Emission Airport Shuttle Regulation to this significant cumulative impact would be cumulatively considerable, given the conclusion in Chapter 4 that the proposed regulations may themselves result in a significant adverse impact on aesthetic resources. Implementation of the project-level mitigation identified in Mitigation Measures 1-1 and 1-2 could effectively reduce the incremental contribution from the ZEASZero-Emission Airport Shuttle Regulation so that it would not be cumulatively considerable, but authority to require that mitigation rests with other agencies that will be authorizing site-specific projects, rather than CARB. Thus, the ZEASZero-Emission Airport Shuttle Regulation **could result in a cumulatively considerable contribution to a significant cumulative impact** on aesthetic resources.

2. Agricultural and Forest Resources

The State SIP Strategy EA found that implementation of the recommended actions, which included the recommendation for the ZEASZero-Emission Airport Shuttle Regulation, could result in impacts to agricultural and forest resources. As discussed in the State SIP Strategy EA, there is uncertainty as to the exact location of these new facilities or the modification of existing facilities. Construction of new facilities could result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide

Importance, Williamson Act conservation contracts, or forest land or timberland, resulting in the loss of these resources. Compliance with existing land use policies, ordinances, and regulations could minimize this impact. Land use impacts would be further addressed for individual projects through the local development review process. Mitigation measures were identified that could reduce these impacts. However, because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and because of the programmatic nature of this EA, impacts were determined to be potentially significant and unavoidable. Thus, the State SIP Strategy, which includes the ZEASZero-Emission Airport Shuttle Regulation, could result in a significant cumulative impact to agricultural and forest resources.

The contribution of the ZEASZero-Emission Airport Shuttle Regulation to this significant impact would be cumulatively considerable, given the conclusion in Chapter 4 that the proposed regulations may themselves result in a significant adverse impact on agricultural and forest resources. Implementation of Mitigation Measure 2-1 could effectively reduce the incremental contribution from the ZEASZero-Emission Airport Shuttle Regulation so that it would not be cumulatively considerable. However, the authority to require that mitigation rests with other agencies that will be authorizing site-specific projects, rather than CARB. Thus, the ZEASZero-Emission Airport Shuttle Regulation **could result in a cumulatively considerable contribution to a significant cumulative impact** on agricultural and forest resources.

3. Air Quality

The State SIP Strategy EA found that implementation of the recommended actions, which included the recommendation for the ZEASZero-Emission Airport Shuttle Regulation, could result in a short-term increase in criteria air pollutants and toxic air contaminants in proximity to where fuel production or handling facilities are constructed or modified, as well as generate unpleasant odors that could affect sensitive receptors. The short-term emissions would result from the use of heavy-duty construction equipment on a short-term basis. Therefore, the State SIP Strategy including the ZEASZero-Emission Airport Shuttle Regulation could generate emission levels that conflict with applicable air quality plans, violate or contribute substantially to an existing or projected ambient air quality standard violation, result in a cumulatively considerable net increase in non-attainment areas, or expose sensitive receptors to substantial pollutant concentrations or odors. Implementation of mitigation measures would not necessarily reduce construction-related air quality impacts to a less-than-significant level because the ability to determine project-level impacts and impose project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the recommended actions in the State SIP Strategy could result in a significant cumulative air quality impact.

The contribution of the ZEASZero-Emission Airport Shuttle Regulation to this significant cumulative impact would be cumulatively considerable, given the conclusion in Chapter 4 that the proposed regulations may themselves result in a significant short-term

construction-related adverse impact on air quality. Implementation of the project-level mitigation identified in Mitigation Measure 3-1 could effectively reduce the incremental contribution from the ZEASZero-Emission Airport Shuttle Regulation so that it would not be cumulatively considerable, but the authority to require that mitigation rests with other agencies that will be authorizing site-specific projects, rather than CARB. Thus, the ZEASZero-Emission Airport Shuttle Regulation **could result in a cumulatively considerable contribution to a short-term significant cumulative impact** on air quality.

4. Biological Resources

The State SIP Strategy EA found that implementation of the recommended actions, which included the recommendation for the ZEASZero-Emission Airport Shuttle Regulation, could require construction and operational activities associated with new or modified facilities or infrastructure. Construction could require disturbance of undeveloped area, such as clearing of vegetation, earth movement and grading, trenching for utility lines, erection of new buildings, and paving of parking lots, delivery areas, and roadways. These activities would have the potential to adversely affect biological resources (e.g., species and habitat) that may reside or be present in those areas. Because there are biological species that occur, or even thrive, in developed settings, resources could also be adversely affected by construction and operations within disturbed areas at existing manufacturing facilities or at other sites in areas with zoning that would permit the development of manufacturing or industrial uses.

The biological resources that could be affected by construction and operation associated with implementation of new regulations and/or incentive measures under the State SIP Strategy would depend on the specific location of any necessary construction and its environmental setting. There is uncertainty as to the exact location of these new facilities or the modification of existing facilities, so precise impacts are not known. Harmful impacts could include modifications to existing habitat; including removal, degradation, and fragmentation of riparian systems, wetlands, or other sensitive natural wildlife habitat and plant communities; interference with wildlife movement or wildlife nursery sites; loss of special-status species; and/or conflicts with the provisions of adopted habitat conservation plans, natural community conservation plans, or other conservation plans or policies to protect natural resources. Implementation of mitigation measures would not reduce these impacts to a less-than-significant level. Implementation of mitigation measures would not necessarily reduce biological resources impacts to a less-than-significant level because the ability to determine project-level impacts and impose project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the recommended actions in the State SIP Strategy could result in a significant cumulative impact on biological resources.

The contribution of the ZEASZero-Emission Airport Shuttle Regulation to this significant cumulative impact would be cumulatively considerable, given the conclusion in Chapter 4 that the proposed regulations may themselves result in a significant adverse impact

on aesthetic resources. Implementation of the project-level mitigation identified in Mitigation Measures 4-1 and 4-2 could effectively reduce the incremental contribution from the ZEASZero-Emission Airport Shuttle Regulation so that it would not be cumulatively considerable, but authority to require that mitigation rests with other agencies that will be authorizing site-specific projects, rather than CARB.

Thus, the ZEASZero-Emission Airport Shuttle Regulation **could result in a cumulatively considerable contribution to a significant cumulative impact** on biological resources.

5. Cultural Resources

The State SIP Strategy EA found that implementation of the recommended actions, which included the recommendation for the ZEASZero-Emission Airport Shuttle Regulation, could require construction activities associated with new or modified facilities or infrastructure. There is uncertainty as to the exact location of these new facilities or the modification of existing facilities. Construction activities could require disturbance of undeveloped area, such as clearing of vegetation, earth movement and grading, trenching for utility lines, erection of new buildings, and paving of parking lots, delivery areas, and roadways. Demolition of existing structures may also occur before the construction of new buildings and structures. The cultural resources that could potentially be affected by ground disturbance activities could include, but are not limited to, prehistoric and historical archaeological sites, paleontological resources, historic buildings, structures, or archaeological sites associated with agriculture and mining, and heritage landscapes. Properties important to Native American communities and other ethnic groups, including tangible properties possessing intangible traditional cultural values, also may exist. Historic buildings and structures may also be adversely affected by demolition-related activities. Such resources may occur individually, in groupings of modest size, or in districts. Because culturally sensitive resources can also be found in developed settings, historic, archeological, and paleontological resources, and places important to Native American communities could also be adversely affected by construction of new facilities. Implementation of mitigation measures would not necessarily reduce construction-related cultural resources impacts to a less-than-significant level because the ability to determine project-level impacts and impose project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, the State SIP Strategy, which includes the ZEASZero-Emission Airport Shuttle Regulation, could result in a significant cumulative impact on cultural resources.

The contribution of the ZEASZero-Emission Airport Shuttle Regulation to this significant cumulative impact would be cumulatively considerable, given the conclusion in Chapter 4 that the proposed regulations may themselves result in a significant adverse impact on biological resources. Implementation of the project-level mitigation identified in Mitigation Measures 5-1 and 5-2 could effectively reduce the incremental contribution from the ZEASZero-Emission Airport Shuttle Regulation so that it would not be cumulatively considerable, but authority to require that mitigation rests with other agencies that will be authorizing site-specific projects, rather than CARB. Thus, the ZEASZero-Emission

Airport Shuttle Regulation **could result in a cumulatively considerable contribution to a significant cumulative impact** on cultural resources.

6. Energy Demand

The State SIP Strategy EA found that implementation of the recommended actions, which included the recommendation for the ZEASZero-Emission Airport Shuttle Regulation, could require construction and operational activities associated with new or modified facilities or infrastructure. Temporary increases in energy demand associated with new facilities would include fuels used during construction, and gas and electric operational demands. Typical earth-moving equipment that may be necessary for construction includes: graders, scrapers, backhoes, jackhammers, front-end loaders, generators, water trucks, and dump trucks. While energy would be required to complete construction for any new or modified facilities or infrastructure projects, it would be temporary and limited in magnitude and would not result in sustained increases in demand that would adversely affect energy supplies. Therefore, the State SIP Strategy, which includes the ZEASZero-Emission Airport Shuttle Regulation, would result in a **less-than-significant cumulative impact** related to construction-related energy demand.

7. Geology and Soils

The State SIP Strategy EA found that implementation of the recommended actions, which included the recommendation for the ZEASZero-Emission Airport Shuttle Regulation, could require construction and operational activities associated with new or modified facilities or infrastructure. Construction and operation could be located in a variety of relatively high-risk geologic and soil conditions that are considered to be potentially hazardous. For instance, the seismic conditions at the site of a new facility may have high to extremely high seismic-related fault rupture and ground shaking potential associated with earthquake activity. New facilities could also be subject to seismic-related ground failure, including liquefaction and landslides. Construction and operational activities could be located in a variety of geologic, soil, and slope conditions with varying amounts of vegetation that would be susceptible to soil erosion. Strong ground shaking could also trigger landslides in areas where the natural slope is naturally unstable or is over-steepened by the construction of access roads and structures. Construction and operation could also occur in locations that would expose facilities and structures to expansive soil conditions. Development of new facilities could be susceptible to the presence of expansive soils particularly in areas of fine-grained sediment accumulation typically associated with playas, valley bottoms, and local low-lying areas. The specific design details, siting locations, seismic hazards, and geologic, slope, and soil conditions for any particular facilities that could occur as a result of reasonably foreseeable compliance responses are not known at this time and would be analyzed on a site-specific basis at the project level. Therefore, for purposes of this analysis, development of these facilities could expose people and structures to relatively high levels of risk associated with strong seismic ground shaking, including liquefaction and landslides, and instability. These geologic, seismic, and soil-related conditions

could result in damage to structures, related utility lines, and access roads, blocking access and posing safety hazards to people. Thus, implementation of the recommended actions in the State SIP Strategy could result in a significant cumulative impact related to geology and soils.

The contribution of the ZEASZero-Emission Airport Shuttle Regulation to this significant cumulative impact would be cumulatively considerable, given the conclusion in Chapter 4 that the proposed regulations may themselves result in a significant adverse impact related to geology and soils. Implementation of the project-level mitigation identified in Mitigation Measures 7-1 and 7-2 could effectively reduce the incremental contribution from the ZEASZero-Emission Airport Shuttle Regulation so that it would not be cumulatively considerable, but authority to require that mitigation rests with other agencies that will be authorizing site-specific projects, rather than CARB. Thus, the ZEASZero-Emission Airport Shuttle Regulation **could result in a cumulatively considerable contribution to a significant cumulative impact** on geology and soils.

8. Greenhouse Gases

The State SIP Strategy EA found that implementation of the recommended actions, which included the recommendation for the ZEASZero-Emission Airport Shuttle Regulation, could require construction activities associated with new or modified facilities or infrastructure. Specific, project-related construction activities could result in increased generation of short-term GHG emissions in limited amounts associated with the use of heavy-duty off-road equipment, materials transport, and worker commutes. A majority of local agencies (e.g., air pollution control districts) do not recommend or require the quantification of short-term construction-generated GHGs for typical construction projects because these only occur for a finite period of time (e.g., during periods of construction) that is typically much shorter than the operational phase, and agencies generally recommended that GHG analyses focus on operational phase emissions, unless the project is of a unique nature requiring atypical (e.g., large scale, long-term) activity levels (e.g., construction of a new dam or levee) for which quantification and consideration (e.g., amortization of construction emissions over the lifetime of the project) may be recommended. Thus, short-term construction related GHG emissions impacts associated with reasonably-foreseeable compliance responses for the recommended actions in the State SIP Strategy are considered less than significant when considered in comparison to the overall GHG reduction associated with implementation of the State SIP Strategy.

The ZEASZero-Emission Airport Shuttle Regulation would result in less-than-significant effects on short-term construction-related GHG emissions and beneficial long-term operational GHG emissions related to implementation of compliance responses. Thus, the ZEASZero-Emission Airport Shuttle Regulation would **not result in a significant cumulative impact** on GHG emission impacts.

9. Hazards and Hazardous Materials

The State SIP Strategy EA found that implementation of the recommended actions, which included the recommendation for the ZEASZero-Emission Airport Shuttle Regulation, could include construction and operation of new or modified facilities or infrastructure. Construction activities may require the transport, use, and disposal of hazardous materials. Construction activities generally use heavy-duty equipment requiring periodic refueling and lubricating. Large pieces of construction equipment (e.g., backhoes, graders) are typically fueled and maintained at the construction site. However, the transport, use, and disposal of hazardous materials would be required to comply with all applicable federal, State and local laws (see Attachment A of this EA). In addition, although there is uncertainty as to the exact locations where new facilities could be constructed or where existing facilities could be reconstructed, these would likely occur within footprints of existing manufacturing facilities, or in areas with zoning that would permit the development of manufacturing or industrial uses. Implementation of the recommended actions in the State SIP Strategy could result in a significant cumulative impact related to hazards and hazardous materials.

The contribution of the ZEASZero-Emission Airport Shuttle Regulation to this significant cumulative impact would be cumulatively considerable, given the conclusion in Chapter 4 that the proposed regulations may themselves result in a significant adverse impact related to geology and soils. Implementation of the project-level mitigation identified in Mitigation Measures 10-1 and 10-2 could effectively reduce the incremental contribution from the ZEASZero-Emission Airport Shuttle Regulation so that it would not be cumulatively considerable, but authority to require that mitigation rests with other agencies that will be authorizing site-specific projects, rather than CARB. Thus, the ZEASZero-Emission Airport Shuttle Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact** on hazards and hazardous materials.

10. Hydrology and Water Quality

The State SIP Strategy EA found that implementation of the recommended actions, which included the recommendation for the ZEASZero-Emission Airport Shuttle Regulation, could include construction and operation of new or modified facilities or infrastructure. Construction activities and long-term operations of new or modified facilities could be located in a variety of conditions with regards to altering drainage patterns, flooding, and inundation by seiche, tsunami, or mudflow. The level of susceptibility varies by location. The specific design details, siting locations, and associated hydrology and water quality issues are not known at this time and would be analyzed on a site-specific basis at the project level. Therefore, for purposes of CEQA disclosure, these potential hydrology and water quality-related impacts could be significant. Implementation of mitigation measures to reduce these impacts would not necessarily reduce these impacts to a less-than-significant level because the ability to determine project-level impacts and impose project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the

recommended actions in the State SIP Strategy could result in a significant cumulative impact to hydrology and water quality.

The contribution of the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation to this significant cumulative impact would be cumulatively considerable, given the conclusion in Chapter 4 that the proposed regulations may themselves result in a significant adverse impact during construction and operation. Implementation of the project-level mitigation identified in Mitigation Measure 10-1 could effectively reduce the incremental contribution from the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation so that it would not be cumulatively considerable, but authority to require that mitigation rests with other agencies that will be authorizing site-specific projects, rather than CARB. Thus, the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact** to hydrology and water quality.

11. Land Use and Planning

Implementation of reasonably foreseeable compliance responses associated with the recommended actions in the State SIP Strategy including the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation could require both construction and long-term operation of new or modified facilities or infrastructure. There is uncertainty as to the exact location of these new facilities or the modification of existing facilities. However, facilities would likely occur within the footprints of existing manufacturing facilities, or in areas with zoning that would permit the development these facilities. Thus, implementation of the recommended actions would not be anticipated to divide an established community or conflict with a land use or conservation plan. Therefore, the State SIP Strategy including the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation would **not result in a significant cumulative impact** on land use and planning.

12. Mineral Resources

The State SIP Strategy EA found that implementation of the recommended actions, which included the recommendation for the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation, could require construction and operation of new or modified facilities or infrastructure. There is uncertainty as to the exact location of these new facilities or the modification of existing facilities. New facilities would likely occur within existing footprints or in areas with consistent zoning, where original permitting and analyses considered these issues; however, implementation of programs under the State SIP Strategy could result in a significant cumulative effect.

In addition, some of the recommended actions and associated compliance responses could require the extraction of minerals (i.e., lithium and platinum) used to manufacture fuel cell and battery technologies. Implementation of these measures would not substantially deplete the supply of lithium or platinum and both are currently used in auto manufacturing processes; however, there is inherent uncertainty surrounding the level of increased lithium mining and battery production. As a result, it is reasonably

foreseeable that increased demand for lithium-ion batteries could result in the loss of a known mineral resource at a mineral resources. Thus, implementation of the State SIP Strategy would result in a significant cumulative effect.

The contribution of the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation to this significant cumulative impact would be cumulatively considerable, given the conclusion in Chapter 4 that the proposed regulations may themselves result in a significant adverse impact during construction. Implementation of the project-level mitigation could effectively reduce the incremental contribution from the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation so that it would not be cumulatively considerable, but authority to require that mitigation rests with other agencies that will be authorizing site-specific projects, rather than CARB. Thus, the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact** to mineral resources.

13. Noise

The State SIP Strategy EA found that implementation of recommended actions, which included the recommendation for the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation, could require construction and operation of new or modified facilities or infrastructure. These activities could result in the generation of short-term construction noise in excess of applicable standards or that result in a substantial increase in ambient levels at nearby sensitive receptors, and exposure to excessive vibration levels, which would be potentially cumulatively significant. Operational noise impacts would not typically be expected due to the fact that typical compliance response activities would likely occur within footprints of existing facilities, or in areas with zoning that would permit the development of these facilities. However, operational effects of equipment constructed as a result of implementation of recommended actions associated with the Energy Sector and Green Buildings could result in potentially significant impacts. Implementation of mitigation measures would not necessarily reduce these impacts to a less-than-significant level because the ability to determine project-level impacts and impose project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the recommended actions in the State SIP Strategy could result in a significant cumulative construction and operational noise impacts.

The contribution of the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation to the significant cumulative construction noise impact would be cumulatively considerable, given the conclusion in Chapter 4 that the proposed regulations may themselves result in a significant adverse construction noise impact. Implementation of the project-level mitigation identified in Mitigation Measure 13-1 could effectively reduce the incremental contribution from the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation so that it would not be cumulatively considerable, but authority to require that mitigation rests with other agencies that will be authorizing site-specific projects, rather than CARB. Thus, the ~~ZEAS~~Zero-Emission Airport Shuttle Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact** on construction noise.

14. Population and Housing

The State SIP Strategy EA found that implementation of the recommended actions, which included the recommendation for the ZEASZero-Emission Airport Shuttle Regulation, could require construction and operation of new or modified facilities or infrastructure. Construction of these facilities activities would require relatively small crews, and demand for these crews would be temporary (e.g., 6 to 12 months per project). Therefore, a substantial amount of construction worker migration would not be likely to occur, and a sufficient construction employment base would likely be available. Construction activities would not require new additional housing or generate changes in land use. It would be expected that the aforementioned facilities would be located within areas of consistent zoning and have sufficient employees and housing to support their operation. Therefore, the State SIP Strategy including the ZEASZero-Emission Airport Shuttle Regulation would **not result in a significant cumulative impact related to population and housing growth.**

15. Public Services

The State SIP Strategy EA found that implementation of the recommended actions, which included the recommendation for the ZEASZero-Emission Airport Shuttle Regulation, could include construction and operation of new or modified facilities or infrastructure. There is uncertainty as to the exact location of these new facilities or the modification of existing facilities. These would likely occur within footprints of existing facilities, or in areas with zoning that would permit the development of these facilities. Construction activities would be anticipated to require relatively small crews, and demand for these crews would be temporary (e.g., 6 to 12 months per project). Therefore, it would be anticipated that the need for a substantial amount of construction worker migration would not occur and that a sufficient construction employment base would likely be available. Construction activities would not require new additional housing to accommodate or generate changes in land use and, therefore, would not affect the provision of public services. It would be expected that the aforementioned facilities would be located within areas of consistent zoning and have sufficient public services to support their operation. Therefore, activities related to the State SIP Strategy, which includes the ZEASZero-Emission Airport Shuttle Regulation, would **not result in a significant cumulative impact related to public services.**

16. Recreation

The State SIP Strategy EA found that implementation of the recommended actions, which included the recommendation for the ZEASZero-Emission Airport Shuttle Regulation, could require construction and operation of new or modified facilities or infrastructure. There is uncertainty as to the exact locations of potential new or modified facilities. These activities would likely occur within footprints of existing facilities, or in areas with zoning that would permit their development. In addition, demand for construction of these crews would be temporary (e.g., 6 – 12 months per project). Therefore, it would be anticipated that the need for a substantial amount of

construction worker migration would not occur. Thus, construction activities associated with reasonably foreseeable compliance responses would not be anticipated to increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration would occur. In addition, the demand for new (or expansion of) recreational-related facilities would not occur as a result of construction activities. It would be expected that the aforementioned facilities would be located within areas of consistent zoning and have sufficient recreational facilities to support their operation. Therefore, the State SIP Strategy including the ZEASZero-Emission Airport Shuttle Regulation **would not result in a significant cumulative impact related to recreational facilities.**

17. Transportation and Traffic

The State SIP Strategy EA found that implementation of the recommended actions, which included the recommendation for the ZEASZero-Emission Airport Shuttle Regulation, could require construction and operation of new or modified facilities or infrastructure. Although detailed information about potential specific construction activities is not currently available, some of the potential compliance responses could result in short-term construction traffic (primarily motorized) from worker commute- and material delivery-related trips. The amount of construction activity would vary depending on the particular type, number, and duration of usage for the varying equipment, and the phase of construction. These variations would affect the amount of project-generated traffic for both worker commute trips and material deliveries. Depending on the amount of trip generation and the location of new facilities, implementation could conflict with applicable programs, plans, ordinances, or policies (e.g., performance standards, congestion management); and/or result in hazardous design features and emergency access issues from road closures, detours, and obstruction of emergency vehicle movement, especially due to project-generated heavy-duty truck trips. Implementation of mitigation measures would not necessarily reduce these impacts to a less-than-significant level because the ability to determine project-level impacts and impose project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the recommended actions in the State SIP Strategy could result in a significant construction-phase cumulative impact on transportation and traffic.

The State SIP Strategy EA found that implementation of the reasonably foreseeable compliance responses under the State SIP Strategy would not, however, result in cumulative impacts associated with long-term operational changes in traffic patterns or vehicle trips, or conflict with existing circulation plans.

The contribution of the ZEASZero-Emission Airport Shuttle Regulation to the significant cumulative construction-phase impact would be cumulatively considerable, given the conclusion in Chapter 4 that the proposed regulations may themselves result in a significant adverse effect on traffic and transportation. Implementation of project-level mitigation identified in Mitigation Measures 17-1 and 17-2 could reduce short-term construction related impacts and long-term operational impacts, respectively, so that it

would not be cumulatively considerable, but authority to require that mitigation lies with land use and/or permitting agencies for individual projects, rather than CARB. Thus, the ZEASZero-Emission Airport Shuttle could result in a **cumulatively considerable contribution to a short-term cumulative impact** on transportation and traffic.

18. Utilities and Service Systems

The State SIP Strategy EA found that implementation of the recommended actions, which included the recommendation for the ZEASZero-Emission Airport Shuttle, could require construction and operations of new or modified facilities or infrastructure. Newly constructed or modified facilities could generate substantial increases in the demand for water supply, wastewater treatment, storm water drainage, and solid waste services in their local areas. Any new or modified facilities would be required to comply with all applicable laws and regulations, including obtaining any required local or State land use approvals, prior to their development. The specific location and type of construction needs is not known and would be dependent upon a variety of market factors that are not within the control of CARB including: economic costs, product demands, environmental constraints, and other market constraints. Thus, the specific impacts from construction on utility and service systems cannot be identified with any certainty. Implementation of mitigation measures would not necessarily reduce these impacts to a less-than-significant level because the ability to determine project-level impacts and impose project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the recommended actions in the State SIP Strategy, which could result in a significant cumulative impact with respect to utilities and service systems.

The contribution of ZEASZero-Emission Airport Shuttle Regulation to this significant cumulative impact would be cumulatively considerable, given the conclusion in Chapter 4 that the proposed regulations may themselves result in a significant adverse impact related to utilities and service systems. Implementation of the project level mitigation identified in Mitigation Measure 18-1 could effectively reduce the incremental contribution from the ZEASZero-Emission Airport Shuttle Regulation so that it would not be cumulatively considerable, but authority to require that mitigation rests with other agencies that will be authorizing site specific projects, rather than CARB. Thus, the ZEASZero-Emission Airport Shuttle Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact** with respect to utilities and service systems.

D. Growth-Inducing Impacts

As described above, a project would be considered growth-inducing if it removes an obstacle to growth, includes construction of new housing, or establishes major new employment opportunities. The reasonably foreseeable compliance responses associated with the ZEASZero-Emission Airport Shuttle Regulation would not directly result in any growth in population or housing, as ZEASzero-emission airport shuttles

would replace existing vehicles and the proposed regulation would not require substantial relocation of employees.

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6.0 MANDATORY FINDINGS OF SIGNIFICANCE

Consistent with the requirements of the California Environmental Quality Act (CEQA) Guidelines section 15065 and section 18 of the Environmental Checklist in Appendix G of the CEQA Guidelines, this EA addresses the mandatory findings of significance for the ZEASZero-Emission Airport Shuttle Regulation.

A. Mandatory Findings of Significance

- 1. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat for a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?**

Under CEQA Guidelines Section 15065(a), a finding of significance is required if a project “has the potential to substantially degrade the quality of the environment.” In practice, this is the same standard as a significant impact on the environment, which is defined in the CEQA Guidelines Section 15382 as “a substantial or potentially substantial adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance.”

As with all the environmental impacts and issue areas, the precise nature, location and magnitude of impacts would be highly variable, and would depend on a range of reasonably foreseeable compliance responses that could occur with implementation of the ZEASZero-Emission Airport Shuttle Regulation. Location, extent, and a variety of other site-specific factors are not known at this time but would be addressed by environmental reviews to be conducted by local or regional agencies with regulatory authority at the project-specific level.

This EA, in its entirety, addresses and discloses potential environmental impacts associated with the recommended actions to comply with the proposed regulation, including direct, indirect, and cumulative impacts in the following resource areas:

- Aesthetics,
- Agriculture and Forest Resources,
- Air Quality,
- Biological Resources,
- Cultural Resources,
- Energy Demand,

- Geology and Soils,
- Greenhouse Gases,
- Hazards and Hazardous Materials,
- Hydrology and Water Quality,
- Land Use and Planning,
- Mineral Resources,
- Noise,
- Population and Housing,
- Public Services,
- Recreation,
- Transportation/Traffic, and
- Utilities and Service Systems.

As described in Chapter 4, this EA discloses potential environmental impacts, the level of significance prior to mitigation, proposed mitigation measures, and the level of significance after the incorporation of mitigation measures.

a) Impacts on Species

Under CEQA Guidelines Section 15065(a)(1), a lead agency shall find that a project may have a significant impact on the environment where there is substantial evidence that the project has the potential to (1) substantially reduce the habitat of a fish or wildlife species; (2) cause a fish or wildlife population to drop below self-sustaining levels; or (3) substantially reduce the number or restrict the range of an endangered, rare, or threatened species. Chapter 4 of this EA addresses impacts that could occur to biological resources, including the reduction of fish or wildlife habitat, the reduction of fish or wildlife populations, and the reduction or restriction of the range of special-status species.

b) Impacts on Historical Resources

CEQA Guidelines Section 15065(a)(1) states that a lead agency shall find that a project may have a significant impact on the environment where there is substantial evidence that the project has the potential to eliminate important examples of a major period of California history or prehistory. CEQA Guidelines Section 15065(a)(1) amplifies Public Resources Code (PRC) Section 21001(c) requiring that major periods of California history are preserved for future generations. It also reflects the provisions of PRC Section 21084.1 that require a finding of significance for substantial adverse changes to historical resources. CEQA Guidelines Section 15064.5 establishes standards for determining the significance of impacts to historical resources and archaeological sites that are a historical resource. Chapter 4 of this EA addresses impacts that could occur

related to California history and prehistory, historic resources, archaeological resources, and paleontological resources.

2. Does the project have impacts that are individually limited, but cumulatively considerable?

As required by CEQA Guidelines Section 15065, a lead agency shall find that a project may have a significant impact on the environment where there is substantial evidence that the project has potential environmental impacts that are individually limited, but cumulatively considerable. As defined in CEQA Guidelines Section 15065(a)(3), cumulatively considerable means “that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.” Cumulative impacts are addressed for each of the environmental topics listed above and are provided in Chapter 5, “Cumulative and Growth-Inducing Impacts,” in this EA.

3. Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?

Consistent with the CEQA Guidelines Section 15065(a)(4), a lead agency shall find that a project may have a significant impact on the environment where there is substantial evidence that the project has the potential to cause substantial adverse impacts on human beings, either directly or indirectly. Under this standard, a change to the physical environment that might otherwise be minor must be treated as significant if people would be significantly affected. This factor relates to adverse changes to the environment of human beings generally, and not to impacts on particular individuals. While changes to the environment that could indirectly affect human beings would be represented by all the designated CEQA issue areas, those that could directly affect human beings include air quality (short-term), geology and soils, hazards and hazardous materials, hydrology and water quality, noise, population and housing, public services, transportation/traffic, and utilities, which are addressed in Chapter 4 of this EA.

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7.0 ALTERNATIVES ANALYSIS

This section satisfies California Environmental Quality Act (CEQA) Guidelines Section 15126.6, which addresses requirements related to alternatives to the proposed project. The following discussion provides an overview of the steps taken to develop alternatives to the proposed action (i.e., adoption of the proposed ZEAS Zero-Emission Airport Shuttle Regulation), the project objectives associated with the proposed action, and an analysis of the alternatives' environmental effects and ability to meet the project objectives.

A. Approach to Alternatives Analysis

CARB certified regulatory program (17 California Code of Regulations (CCR) Sections 60000–60008) requires that where a contemplated action may have a significant effect on the environment, a document shall be prepared in a manner consistent with the environmental protection purposes of CARB's program and with the goals and policies of CEQA. Among other things, the document must address potentially feasible alternatives to the proposed action that would substantially reduce any significant adverse impact identified and would meet most of the basic objectives of the project.

The certified regulatory program provides general guidance that any action or proposal for which significant adverse environmental impacts have been identified during the review process shall not be approved or adopted as proposed if there are feasible mitigation measures or feasible alternatives available that would substantially reduce such adverse impacts. For purposes of this section, "feasible" means capable of being accomplished in a successful manner within a reasonable period, taking into account economic, environmental, social, and technological factors, and consistent with the Board's legislatively mandated responsibilities and duties (17 CCR Section 60006).

While CARB, by its certified program, is exempt from Chapters 3 and 4 of CEQA and corresponding sections of the CEQA Guidelines, the Guidelines nevertheless provide useful information for preparation of a thorough and meaningful alternatives analysis. CEQA Guidelines Section 15126.6(a) speaks to evaluation of "a range of reasonable alternatives to the project, or the location of the project, which would feasibly attain most of the basic project objectives but would avoid or substantially lessen any of the significant effects, and evaluate the comparative merits of the alternatives." The purpose of the alternatives analysis is to determine whether different approaches to or variations of the project would reduce or eliminate significant project impacts, within the basic framework of the objectives, a principle that is consistent with CARB's program requirements.

The range of alternatives is governed by the "rule of reason," which requires evaluation of only those alternatives "necessary to permit a reasoned choice" (14 CCR Section 15126.6 subd. (f)). Further, an agency "need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative" (14 CCR Section 15126.6 subd. (f)(3)). The analysis should focus on

alternatives that are feasible and that take economic, environmental, social, and technological factors into account. Alternatives that are remote or speculative need not be discussed. Furthermore, the alternatives analyzed for a project should focus on reducing or avoiding significant environmental impacts associated with the project as proposed.

CARB has identified three alternatives that represent a reasonable range of alternatives that will allow the public and the Board to understand the differences between different types or combination of approaches.

B. Project Objectives

Recognizing the requirements of Assembly Bill (AB) 32 to reduce GHG emissions, the need for California to attain the National and State ambient air quality standards for criteria air pollutants and to reduce exposure to toxic air contaminants (TAC), the primary objectives of the ZEASZero-Emission Airport Shuttle Regulation include the following:

1. Achieve the maximum emissions reduction possible from airport shuttles to attain the national ambient air quality standards for criteria air pollutants (Health & Safety Code Sections 43000.5(b), 43018(a)).
2. Accelerate the replacement of internal combustion powered airport shuttles with equivalent zero-tailpipe emission vehicles (Health & Safety Code Sections 40000, 43013).
3. Reduce the State's dependence on petroleum as an energy resource and support the use of diversified fuels in the State's transportation fleet (Health & Safety Code Section 43000(e), California Public Resources Code (PRC) Section 25000.5). In addition, petroleum use as an energy resource contributes substantially to the following public health and environmental problems: air pollution, acid rain, global warming, and the degradation of California's marine environment and fisheries (PRC Section 25000.5(b), (c)).
4. Decrease GHG emissions in support of statewide GHG reduction goals by adopting a "Zero-Emission Airport Shuttle program," as directed by AB 32. The 2016 Mobile Source Strategy aim to accelerate development and deployment of the cleanest feasible mobile source technologies and to improve access to clean transportation. Implementation of the ZEASZero-Emission Airport Shuttle Shuttle Regulation would also provide further GHG reductions pursuant to AB 1493 (Ch. 200, Stats. of 2002, Pavley).
5. Develop a regulation that is consistent with and meets the goals of the State Implementation Plan (SIP), providing necessary emission reductions for all of California's nonattainment areas to meet federal ambient air quality standards (Health & Safety Code Sections 39002, 39003, 39602.5, 43018, 43000, 43000.5, 43013, 43018).

6. Maintain and continue reductions in emissions of GHGs beyond 2020, in accordance with AB 32 (Health & Safety Code Sections 38551(b), 38562, 38562.5, 38566); pursue measures that implement reduction strategies covering the State's GHG emissions in furtherance of California's mandate to reduce GHG emissions to the 1990 level by 2020 and 40 percent below the 1990 level by December 31, 2030.
7. Aid the transition of California's heavy-duty transportation sector from combustion to electric powertrains.
8. Complement existing programs and plans to ensure, to the extent feasible, that activities undertaken pursuant to the measures complement, and do not interfere with, existing planning efforts to reduce GHG emissions, criteria pollutants, petroleum-based transportation fuels, and TAC emissions.
9. Incentivize and support emerging ZEV technology that will be needed to achieve CARB's SIP goals.
10. Achieve emission reductions that are real, permanent, quantifiable, verifiable, and enforceable (Health & Safety Code Sections 38560, 38562(d)(1)).
11. Encourage public and private airport shuttle fleets to utilize incentive grants and cost sharing opportunities through Senate Bill (SB) 350 to off-set the capital vehicle and infrastructure investments.
12. Ensure all Californians can live, work, and play in a healthful environment free from harmful exposure to air pollution. Protect and preserve public health and well-being, and prevent irritation to the senses, interference with visibility, and damage to vegetation and property (Health & Safety Code Section 43000(b)) in recognition that the emission of air pollutants from motor vehicles is the primary cause of air pollution in many parts of the State (Health & Safety Code Section 43000(a)).
13. Spur economic activity. Incentivize innovation that will transition California's economy into greater use of clean and sustainable technologies and promote increased economic and employment benefits that will accompany this transition (AB 1493, Section 1(g); Health & Safety Code Section 38501(e)).
14. The objective of the ZEP Cert proposal is to support existing and future CARB zero-emission programs by encouraging the development of robust heavy-duty electric and fuel cell vehicles, ensuring a minimum level of in-use support for zero-emission technology, and supporting the overall transition of the technology into the heavy-duty vehicle segment.

C. Description of Alternatives

Detailed descriptions of each alternative are presented below. The analysis that follows the descriptions of the alternatives includes a discussion of the degree to which each alternative meets the basic project objectives, and the degree to which each alternative avoids a potentially significant impact identified in Chapter 4.

1. Alternative 1: No Project Alternative

a) Alternative 1 Description

Alternative 1, the No-Project Alternative, is included to disclose environmental information that is important for considering the ZEASZero-Emission Airport Shuttle Regulation. The No-Project Alternative is included only to assist in the analysis and consideration of this portion of the ZEASZero-Emission Airport Shuttle Regulation and the action alternatives. It is useful to include a “No-Project Alternative” in this analysis for the same reasons that this type of alternative is called for in the State CEQA Guidelines. As noted in the CEQA Guidelines, “the purpose of describing and analyzing a no-project alternative is to allow decision-makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project” (14 CCR Section 15126.6(e)(1)). The No-Project Alternative also provides an important point of comparison to understand the potential environmental benefits and impacts of the other alternatives.

Under the No Project Alternative, the ZEASZero-Emission Airport Shuttle Regulation would not occur. Existing conditions would continue: Airport shuttles would not be required to meet a zero-emission compliance obligation; and vehicle, equipment, and engine manufacturers would not be required to comply with the zero-emission powertrain certification as proposed.

b) Alternative 1 Discussion

i. Objectives

The No-Project Alternative would fail to meet many of the project objectives listed in Chapter 2 (and reproduced above), because criteria pollutant and GHG reductions would not be accelerated in the manner necessary to achieve air quality standards and GHG requirements. Without regulatory requirements, development and use of ZEASzero-emission airport shuttles would not increase fast enough to meet CARB’s air quality standards and GHG reduction targets. It is unlikely that shuttle manufacturers would increase production of ZEASzero-emission airport shuttles above existing levels in response to market demand alone. Economies of scale in production costs would not be realized unless manufacturers commit to producing larger volumes of these alternative vehicles.

Under the No Project Alternative, criteria pollutant and GHGs emissions would not decrease. The No Project Alternative would also fail to fulfill either the AB 1493

mandate to achieve maximum feasible GHG reductions or the AB 32 mandate to reduce GHG emissions to 1990 levels by 2020. The No Project Alternative would not result in energy savings. The No Project Alternative would not help attain the California and national ambient air quality standards and it would fail to ensure all Californians live, work, and play in a healthful environment free from harmful exposure to air pollution.

In summary, the No Project Alternative would not meet most of the basic project objectives.

ii. Environmental Impacts

There would be no new environmental impacts under the No Project Alternative compared to baseline because compliance responses would be the same as under the existing regulatory environment. It is anticipated that the No Project Alternative would not result in the development of new manufacturing plants that specialize in the production of propulsion batteries or fuel cells, or the modification or expansion of existing production facilities. The proportion of ZEVs in the statewide vehicle fleet would likely not increase and, therefore, new hydrogen fueling stations would not be developed under the existing regulation. Thus, no impacts related to new or expanded facilities would occur under the No Project Alternative.

Beneficial impacts resulting from the ZEASZero-Emission Airport Shuttle Regulation would not occur under the No Project Alternative. This would include reduction of criteria and GHG beyond what is required under existing regulations and reduction energy saving. In addition to failing to meet project objectives, this would put the No Project Alternative at a substantial environmental disadvantage, compared to the ZEASZero-Emission Airport Shuttle Regulation.

2. Alternative 2: Less Stringent Purchase Requirement

a) Alternative 2 Description

Alternative 2 is identical to the Proposed Regulations, however it will require, in 2035, a 75 percent ZEASzero-emission airport shuttles in-use fleet composition requirement as opposed to the regulation 100 percent in-use fleet percentage requirement.

Therefore, this alternative, after a voluntary, early action period the fleet compliance schedule will begin with the no-back sliding provision starting in 2023 that will require a fleet to replace an existing in-use ZEASzero-emission shuttles with a ZEASzero-airport shuttle. Followed by in-use fleet percentage requirements that requires a certain percentage of a fleet to consist of ZEASzero-emission airport shuttles by:

- 2027: 33 percent ZEASzero-emission airport shuttle fleet requirement;
- 2031: 66 percent ZEASzero-emission airport shuttle fleet requirement;
- 2035: 75 percent ZEASzero-emission airport shuttle fleet requirement.

Mandatory reporting would ensure that emission reductions would be achieved by replacing internal combustion vehicles with ZEASzero-emission shuttles.

b) Alternative 2 Discussion

i. Objectives

Emission reductions achieved under this alternative would not be as great as the reductions that would be achieved under the ZEASZero-Emission Airport Shuttle Regulation. The less stringent purchase requirement will result in less emissions reduction benefits compared with the ZEASZero-Emission Airport Shuttle Regulation. In addition, the less stringent purchase requirement may not accelerate the zero-emission technology advancement and drive down the price of zero-emissions shuttles as fast as the current proposal. This could prevent California from achieving the GHG reduction goal of AB 32, particularly if CARB cannot develop other programs or regulations to reduce GHG emissions. As such, this alternative would partially achieve some of the project objectives identified under the Proposed Project, but not to the same degree as the Proposed Project.

ii. Environmental Impacts

Alternative 2 would result in lower overall demand for vehicle manufacturing and would therefore have reduced environmental impact as related to manufacturing. Decreased environmental impacts would be related to fewer ZEASzero-emission airport shuttle infrastructure installations needed with the smaller scope reducing construction-related activities and therefore lessening short-term construction-related impacts to biological resources, geology and soil, cultural resources impacts, and hydrology and water quality, associated with installation of electric vehicle charging/refueling infrastructure. Alternative 2 would produce fewer operational impacts as compared to the ZEASZero-Emission Airport Shuttle Regulation because of the reduced number of airport shuttle contribution; however, it would be expected that although such impacts would be less, potentially significant and unavoidable impacts to aesthetics, agricultural resources, air quality, biological resources, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, noise, transportation and traffic, and utility and service systems from implementation of Alternative 2 could occur.

Beneficial air quality, GHG, and energy effects would be anticipated to be less than those that would occur with implementation of the ZEASZero-Emission Airport Shuttle Regulation because fewer combustion fueled shuttles would be replaced and at a slower rate. Therefore, the primary goals of this Proposed Project would not be achieved using this alternative.

3. Alternative 3: More Stringent Purchase Requirement

a) Alternative 3 Description

The Accelerated Phase-in Alternative shifts regulation compliance to initial no-back sliding provision in 2020, rather than 2023 and then requires full ZEASzero-emission shuttle compliance adoption by 2028, which is sooner than the Proposed Regulation. Reporting is required beginning in 2019, the year before the no-back sliding provision in 2020.

The compliance mechanisms of this alternative are similar to those found in the ZEASZero-Emission Airport Shuttle Regulation. However, this accelerated phase-in alternative proposes an accelerated rate of ZEASszero-emission airport shuttle adoption by implementing the no-back sliding provision and fleet percentage requirements three years earlier than the ZEASZero-Emission Airport Shuttle Regulation. This alternative's final compliance year, 2028 is seven years sooner than the Proposed Regulation's 2035 compliance year.

b) Alternative 3 Discussion

i. Objectives

This Accelerated Phase-in Alternative would cost more for airport shuttle fleet owners. The earlier compliance dates would significantly truncate the voluntary early action period from four- to two-years. Allowance of time for fleets to leverage incentive funding is a function that staff believes is critical for the ZEASZero-Emission Airport Shuttle Regulation's success. In the majority of cases, incentive funding is provided for voluntary action, therefore, when the regulatory requirements become effective, many fleets will be ineligible from accessing these funds. Furthermore, shortening of the overall regulatory clock creates a limitation on fleets' ability to advantageously leverage predicted economies of scale, in later years, which are associated with increased production of heavy-duty ZEASzero-emission airport shuttles.

The combination of these economic impacts would increase compliance costs for affected businesses. Staff believes that this is an economic burden that would threaten the success of the ZEASZero-Emission Airport Shuttle Regulation.

ii. Environmental Impacts

This alternative's accelerated ZEASszero-emission airport shuttle purchases would similarly accelerate emission reductions, as the fleet would turn over seven years sooner than the ZEASZero-Emission Airport Shuttle Regulation and the estimated cumulative emission reductions of NO_x and CO₂e over the analysis period, 2017 - 2035, are approximately 1.4 times those of the ZEASZero-Emission Airport Shuttle Regulation. However, a fundamental purpose of a CEQA alternatives analysis is to identify alternatives which would reduce or avoid one or more significant environmental

impacts. This alternative would not avoid any identified potentially significant adverse environmental impact, as it involves a more stringent version of the proposed regulation.

D. Alternatives Considered but Rejected

Additional alternatives were considered during development of the alternatives to the Proposed Project. The CEQA Guidelines Section 15126.6(c) includes three factors that may be used to eliminate alternatives from detailed consideration in an EIR: “i. Failure to meet most of the basic project objectives; ii. Infeasibility, or iii. Inability to avoid significant environmental impact.”

1. No Phase-in of the 100% Requirement

Under this alternative, fleet owners must meet a 100% ~~ZEAS~~zero-emission airport shuttle composition requirement in the compliance year, 2035. In the years leading to the compliance year, this alternative has no mandate for early year ~~ZEAS~~zero-emission shuttle purchases and specifies no ~~ZEAS~~zero-emission airport shuttle composition requirements. Therefore, any ~~ZEAS~~zero-emission shuttles purchases made by regulated fleets in the years leading up to the compliance year would be entirely voluntary. This would significantly extend the regulation’s voluntary early action period for all fleets to apply for incentive grant funding. Retaining the final end point and mandatory reporting would ensure that emission reductions would be achieved by replacing internal combustion vehicles with ~~ZEAS~~zero-emission airport shuttles.

This alternative would not, in early years, provide the market a signal that technology should be adopted and increases the risk of noncompliance in the first regulatory compliance year, 2035, should fleets procrastinate on purchasing technology to meet the fleet composition requirement. Conversely, the rate of voluntary adoption of technology has potential for being very low and therefore, in this scenario, there is very high risk for minimal to no early deployment credit and an increased risk of incurred penalties for companies that fail to meet the requirement by the compliance date.

The combination of these two outcomes would significantly hinder the ability to appropriately plan infrastructure and would magnify the impact to the environment by requiring all construction-related activities to happen in a few years instead of being spread out over two decades, which include air emissions resulting from construction activities. Delay in technology adoption would also result in the rush of ~~ZEAS~~zero-emission shuttle production orders which would force manufacturers to scale-up manufacturing facilities in a short period of time. This would add potential adverse environmental impacts associated with manufacturing due to inefficiencies in the comparatively rapid scaling of manufacturing systems (a few years rather than over a decade) and subsequent increases in resource consumption such as energy, fuel, etc. Such a surge in production would transfer pressure up the supply chain due to increased demand for raw materials and parts, such as increased mining activities for the precious/exotic metals needed for batteries.

Procrastination would also result in short-term or reactive planning by electric utilities and/or merchant hydrogen suppliers in meeting transportation energy demand that results in more infrastructure upgrade activities. This is in contrast to the ZEASZero-Emission Airport Shuttle Regulation's long compliance schedule, which includes incremental milestones that encourage systematic infrastructure improvements to meet stepwise energy demand, improving overall system efficiency.

This alternative would result in lower overall air pollutant emission reductions due to a predicted shorter period in which zero-emission technologies will be in-use. While airport shuttle fleets could decide to transition to ZEASzero-emission shuttle before the regulatory requirement, regardless of CARB's action on the ZEASZero-Emission Airport Shuttle Regulation, it would not be due to CARB's regulatory authority.

This alternative would provide minimal early commercial development impact due to a reduced number of shuttles, which is contrary to the secondary goal of the ZEASZero-Emission Airport Shuttle Regulation, a contribution toward a more robust heavy-duty ZEV market.

Accordingly, alternatives that do not achieve the mandate of air emission reductions are inconsistent with CARB's legislative direction. While airport shuttle fleet owners could decide to take early action on the purchase of ZEASzero-emission shuttles and installation of energy infrastructure, since it will not be mandated under CARB's action on the ZEASZero-Emission Airport Shuttle Regulation, there is no guarantee that this will occur and there is significant risk that compliance procrastination will undermine the intent of the regulation.

2. Ultra-low NOx Engine Emission Rate Averaging Alternative

This alternative introduces an ultra-low NOx vehicle option as an interim compliance alternative instead of a 100 percent ZEASzero-emission airport shuttle requirement. Ultra-low NOx is defined as an internal combustion engine that complies with a 0.02 g/bhphr NOx emission rate. Under this alternative, fleets would have the option to purchase shuttles powered by an internal combustion engine that complies with the ultra-low NOx emission rate. These vehicles would also be required to operate on renewably derived fuel. In 2027, the fleet would need to comply with an emission rate that averages 33% zero tailpipe emissions into their total fleet ramping up in 2031 to 66% of fleet zero-tailpipe emissions and then in 2035 to 100% of fleet zero tailpipe emissions.

This alternative does not meet the goals of the SIP. The use of internal combustion engines will not meet the requirements, which are the elimination of tailpipe criteria pollutant emissions within the nonattainment areas and a shift of the vehicle population towards zero-emission technologies.

Although a renewable fuel component would reduce lifecycle emissions, the emission reduction required by the SIP will not occur within nonattainment areas. Furthermore, the intent of the regulation is the requirement of ZE technologies in a fleet that is

especially suited for ZE technologies, as they exist in today's market. The regulation has been optimized to impact fleets that have specific operating characteristics that are compatible with zero-emission technologies. The introduction of an internal combustion option during the fleet ~~ZEAS~~zero-emission shuttle transformation period would undermine the heavy-duty ZEV commercialization component of the regulation.

Accordingly, alternatives that do not achieve the mandate of air emission reductions are inconsistent with CARB's legislative direction. While privately-owned airport shuttle fleets could decide to buy ~~ZEAS~~zero-emission shuttles, it is likely that fleets will gravitate to the option closest to business-as-usual, i.e., the ultra-low NOx combustion pathway, given the option to purchase the interim solution. Fleets that choose the ultra-low NOx option will have difficulty complying with the ~~ZEAS~~zero-emission airport shuttle mandate in later years, as early action incentive funding will no-longer be available, increasing risk of noncompliance. The primary goals of this Proposed Project would not be achieved using this alternative.

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ATTACHMENT A: ENVIRONMENTAL AND REGULATORY SETTING

1. AESTHETICS

A. Existing Conditions

1. U.S.

The United States (U.S.), by its size, setting, and topographic and climate variation, exhibits tremendous scenic diversity. The varied landscape ranges from coastal to desert and valley to mountain. Innumerable natural features and settings combine to produce scenic resources that are treasured by residents and visitors alike.

Aesthetic value can be affected by visibility, which is directly related to the presence of airborne particles. Visibility-reducing particles consist of suspended particulate matter, a complex mixture of tiny particles consisting of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. Particles vary greatly in shape, size, and chemical composition, and can be made up of many different materials such as metals, soot, soil, dust, and salt (CARB 2009).

2. California

Like the U.S., the visual character of California varies greatly related to topography and climate. The foothills form a transitional landform from the valley floor to the higher Sierra Nevada, Cascade, and Coast Ranges. The valley floor is cut by two rivers that flow west out of the Sierra Nevada and east out of the Coast Ranges. Irrigated agriculture land is the primary landscape in the Sacramento and San Joaquin Valleys, and the foothill landscape has been altered by grazing, mining, reservoir development, and residential and commercial development. The visual character of the state also varies dramatically from the north, which is dominated by forest lands, and the south, which is primarily residential and commercial development.

B. Regulatory Setting

Applicable laws and regulations associated with aesthetics and scenic resources are discussed in Table A1.

Table A1: Applicable Laws and Regulations for Aesthetic Resources	
Applicable Regulations	Description
Federal	
Federal Land Policy and Management Act of 1976 (FLPMA)	FLPMA is the enabling legislation establishing the Bureau of Land Management's (BLM's) responsibilities for lands under its jurisdiction. Section 102 (a) of the FLPMA states that "...the public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resources, and archeological values..." Section 103(c) identifies "scenic values" as one of the resources for which public land should be managed.
BLM Contrast Rating System	The contrast rating system is a systematic process used by BLM to analyze visual impacts of proposed projects and activities. It is primarily intended to assist BLM personnel in the resolution of visual impact assessment.
Natural Historic Preservation Act (NHPA)	Under regulations of the NHPA, visual impacts to a listed or eligible National Register property that may diminish the integrity of the property's "setting ... [or] ... feeling" in a way that affects the property's eligibility for listing may result in a potentially significant adverse effect. "Examples of adverse effects ... include...: Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features." Title 36 Code of Federal Regulations (CFR) Part 800.5)
National Scenic Byways Program	Title 23, Sec 162 outlines the National Scenic Byways Program. This program is used to recognize roads having outstanding scenic, historic, cultural, natural, recreational, and archaeological qualities through designation of road as: National Scenic Byways; All-American Roads; or America's Byways. Designation of the byways provides eligibility for Federal assistance for safety improvement, corridor management plans, recreation access, or other project that protect scenic, historical, recreational, cultural, natural, and archaeological resources.
State	
Ambient Air Quality Standard for Visibility-Reducing Particles	Extinction coefficient (measure of absorption of light in a medium) of 0.23 per kilometer — visibility of 10 miles or more (0.07 — 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent.
California Streets and Highway Code, Section 260 through 263 – Scenic Highways	The State Scenic Highway Program promotes protection of designated State scenic highways through certification and adoption of local scenic corridor protection programs that conform to requirements of the California Scenic Highway Program.

Table A1: Applicable Laws and Regulations for Aesthetic Resources

Applicable Regulations	Description
Local	
County and City Controls	Most local planning guidelines to preserve and enhance the visual quality and aesthetic resources of urban and natural areas are established in the jurisdiction's general plan. The value attributed to a visual resource generally is based on the characteristics and distinctiveness of the resource and the number of persons who view it. Vistas of undisturbed natural areas, unique or unusual features forming an important or dominant portion of a viewshed, and distant vistas offering relief from less attractive nearby features are frequently considered to be scenic resources. In some instances, a case-by-case determination of scenic value may be needed, but often there is agreement within the relevant community about which features are valued as scenic resources. In addition to federal and State designations, counties and cities have their own scenic highway designations, which are intended to preserve and enhance existing scenic resources. Criteria for designation are commonly included in the conservation/open space element of the city or county general plan.

2. AGRICULTURAL AND FOREST RESOURCES

A. Existing Conditions

1. U.S.

Forests in the U.S. are very diverse in composition and distribution, including oak-hickory and maple-beech-birch forests, as well as fir, pine, and redwood forests. It is estimated that, at the beginning of European settlement (circa 1630), the area of forest land in the current boundaries of the U.S. was approximately 423 million hectares, or about 46 percent of the total land area. By 1907, the area of forest land had declined to an estimated 307 million hectares or 34 percent of the total land area. Forest area has been relatively stable since 1907. In 1997, 302 million hectares or 33 percent of the total land area of the U.S. was in forest land. As of 2000, forest land area amount to approximately 70 percent of the area that was forested in 1630. Since 1630, approximately 120 million hectares of forest land have been converted to other uses, primarily agriculture (U.S. Forest Service (USFS) 2014).

U.S. land area amounts to nearly 2.3 billion acres, with nearly 1.2 billion acres in agricultural lands. The proportion of the land base in agricultural uses declined from 63 percent in 1949 to 51 percent in 2007, the latest year for which data are available. Gradual declines have occurred in cropland and pasture/range, while grazed forestland has decreased more rapidly. In 2007, 408 million acres of agricultural land were in cropland (-17 percent from 1949), 614 million acres were in pasture and range (-3 percent), 127 million acres were in grazed forestland (-52 percent), and 12 million acres were in farmsteads and farm roads (-19 percent) (U.S. Department of Agriculture (USDA) 2016).

The 2012 Census of Agriculture recorded 2,109,303 farms in the U.S. The top five states, based on the value of agricultural products sold and on their percentage of the total value are: California (10.8 percent), Iowa (7.8 percent), Texas (6.4 percent), Nebraska (5.8 percent) and Minnesota (5.4 percent). Most states have laws in place to support agriculture and protect agricultural land.

2. California

The State maps and classifies farmland through the California Department of Conservation Farmland Mapping and Monitoring Program (FMMP). Classifications are based on a combination of physical and chemical characteristics of the soil and climate that determine the degree of suitability of the land for crop production. The classifications under the FMMP are as follows:

- Prime Farmland—land that has the best combination of features to produce agricultural crops;
- Farmland of Statewide Importance—land other than Prime Farmland that has a good combination of physical and chemical features to produce agricultural crops, but that has more limitations than Prime Farmland, such as greater slopes or less ability to store soil moisture;
- Unique Farmland—land of lesser quality soils used to produce the state's leading agricultural cash crops;
- Farmland of Local Importance—land of importance to the local agricultural economy;
- Grazing Land—existing vegetation that is suitable for grazing;
- Urban and Built-Up Land—land occupied by structures in density of at least one dwelling unit per 1.5 acres;
- Land Committed to Nonagricultural Use—vacant areas; existing land that has a permanent commitment to development but has an existing land use of agricultural or grazing lands; and
- Other Land— land not included in any other mapping category, common examples of which include low-density rural developments, brush, timber, wetland, and vacant and nonagricultural land surrounded on all sides by urban development.

California Environmental Quality Act (CEQA) Section 21095 and CEQA Guidelines Appendix G, together, define Prime, Unique, and Farmland of Statewide Importance as "Important Farmland," whose conversion may be considered significant. Local jurisdictions can further consider other classifications of farmland as important and can also use an agricultural land evaluation and site assessment (LESA) model to determine farmland importance and impacts from conversion.

As of 2012, California contained approximately 5 million acres of Prime Farmland; approximately 2.6 million acres of Farmland of Statewide Important; approximately 1.3 million acres of Unique Farmland; approximately 3.2 million acres of Farmland of Local Importance; and approximately 19.2 million acres of grazing land (DOC 2015).

California produces over a third of the vegetables and two thirds of the fruits and nuts in the U.S. California's agricultural abundance includes more than 400 commodities and supplies 99 percent or more of the following to the U.S.: almonds, artichokes, dates, dried plums, figs, garlic, kiwifruit, olives and olive oil, pistachios, raisins, table grapes, and walnuts. In 2016, 76,700 farms operated in California, which is less than 1 percent less than in 2015. Over 27 percent of California farms generated commodity sales over \$100,000, greater than the national average of 20 percent. The amount of land devoted to farming and ranching in California decreased slightly to 25.4 million acres in 2016. The average farm size was 331 acres in 2016, up from the 2015 farm size, but still below the national average of 442 acres (California Department of Food and Agriculture (CDFA) 2017).

a) Williamson Act

The California Land Conservation Act of 1965, commonly referred to as the Williamson Act, enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space use. In return, landowners receive property tax assessments which are much lower than normal because they are based upon farming and open space uses as opposed to full market value. The Open Space Subvention Act of 1971 provided local governments an annual subvention of forgone property tax revenues from the state through the year 2009; these payments have been suspended in more recent years due to revenue shortfalls.

Of California's 58 counties, 52 have executed contracts under the Land Conservation Act Program. The 14.8 million acres reported as enrolled in Land Conservation Act contracts statewide as of December 2015, represents approximately 50 percent of California's farmland total of about 30 million acres, or about 31 percent of the State's privately-owned land (California Department of Conservation (DOC) 2016).

b) Forestry Resources

Forestland is defined as land that can support 10 percent 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 (Public Resources Code (PRC) Section 12220(g)). There are 40,233,000 acres of forested land within California including oak woodlands and conifer forests (California Department of Fish and Wildlife (CDFW) 2014).

Timberland is privately-owned land, or land acquired for State forest purposes, which is devoted to and used for growing and harvesting timber, or for growing and harvesting timber and compatible uses, of, at minimum 15 cubic feet per acre (Government Code Section 51104(f)). Forest managed for harvest is called timberland and includes 2,932,000 acres in private ownership; 146,000 acres in State ownership; 10,130,000 acres in federal ownership; and 4,551,000 acres of non-industrial timberland in private ownership (CDFW 2017).

B. Regulatory Setting

Table A2 below provides a general description of applicable laws and regulations that may pertain to agriculture and forest resources.

Table A2: Applicable Laws and Regulations for Agriculture and Forest Resources	
Applicable Regulations	Description
Federal	
Farmland Protection Policy Act (FPPA)	The FPPA directs federal agencies to consider the effects of federal programs or activities on farmland, and ensure that such programs, to the extent practicable, are compatible with state, local, and private farmland protection programs and policies. The rating process established under the FPPA was developed to help assess options for land use on an evaluation of productivity weighed against commitment to urban development.
National Forest Management Act (NFMA) of 1976	The NFMA is the primary statute governing the administration of national forests. The NFMA requires the Secretary of Agriculture to assess forest lands, develop a management program based on multiple-use, sustained-yield principles, and implement a resource management plan for each unit of the National Forest System. Goal 4 of the USFS's National Strategic Plan for the National Forests states that the nation's forests and grasslands play a significant role in meeting America's need for producing and transmitting energy. Unless otherwise restricted, National Forest Service lands are available for energy exploration, development, and infrastructure (e.g., well sites, pipelines, and transmission lines). However, the emphasis on non-recreational special uses, such as utility corridors, is to authorize the special uses only when they cannot be reasonably accommodated on non-National Forest Service lands.
State	
The California Land Conservation Act, also known as the Williamson Act (Government Code Section 51200 et seq.)	The DOC's Division of Land Resource Protection administers the Williamson Act program, which permits property tax adjustments for landowners who contract with a city or county to keep their land in agricultural production or approved open space uses for at least 10 years. Lands covered by Williamson Act contracts are assessed on the basis of their agricultural value instead of their potential market value under nonagricultural uses. In return for the preferential tax rate, the landowner is required to contractually agree to not develop the land for a period of at least 10 years. Williamson Act contracts are renewed annually for 10 years unless a party to the contract files for nonrenewal. The filing of a non-renewal application by a landowner ends the automatic annual extension of a contract and starts a 9-year phase-out of the contract. During the phase-out period, the land remains restricted to agricultural and open-space uses, but property taxes gradually return to levels associated with the market value of the land. At the end of the 9-year non-renewal process, the contract expires, and the owner's uses of the land are restricted only by applicable local zoning. The Williamson Act defines compatible use of contracted lands as any use determined by the county or city administering the agricultural preserve to be compatible with the agricultural, recreational, or open space use of land within the preserve and subject to contract (Government Code, Section 51201 (e)). However, uses deemed compatible by a county or city government must be consistent with the principles of compatibility set forth in

Table A2: Applicable Laws and Regulations for Agriculture and Forest Resources	
Applicable Regulations	Description
	Government Code, Section 51238.1. Approximately 16 million acres of farmland (about 50 percent of the State's total farmland) are enrolled in the program.
California Farmland Conservancy Program (CFCP) (PRC Section 10200 et seq.)	The CFCP provides grant funding for agricultural conservation easements. Although the easements are always written to reflect the benefits of multiple resource values, there is a provision in the CFCP statute that prevents easements funded under the program from restricting husbandry practices. This provision could prevent restricting those practices to benefit other natural resources.
FMMP (Government Code Section 65570, PRC Section 612)	Under the FMMP, DOC assesses the location, quality, and quantity of agricultural lands and conversion of these lands over time. Agricultural designations include the categories of Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, Grazing Land, Urban and Built-Up Land, and Other Land.
State Lands Commission Significant Land Inventory	The State Lands Commission is responsible for managing lands owned by the State, including lands that the State has received from the federal government. These lands total more than 4 million acres and include tide and submerged lands, swamp and overflow lands, the beds of navigable waterways, and State School Lands. The State Lands Commission has a legal responsibility for, and a strong interest in, protecting the ecological and Public Trust values associated with the State's sovereign lands, including the use of these lands for habitat preservation, open space, and recreation. Projects located within these lands would be subject to the State Lands Commission permitting process.
Local	
Open Space Element (Government Code Section 65300 et seq.)	State law requires each city and county to adopt a general plan containing at least seven mandatory elements including an open space element. The open space element identifies open space resources in the community and strategies for protection and preservation of these resources. Agricultural and forested lands are among the land use types identified as open space in general plans.
Zoning	The city or county zoning code is the set of detailed requirements that implement the general plan policies at the level of the individual parcel. The zoning code presents standards for different land uses and identifies which land uses (e.g., agriculture, residential, commercial, industrial) are allowed in the various zoning districts of the jurisdiction. Since 1971, State law has required the city or county zoning code to be consistent with the jurisdiction's general plan, except in charter cities.

3. AIR QUALITY

A. Existing Conditions

1. U.S.

At the federal level, the U.S. Environmental Protection Agency (U.S. EPA) has oversight of state programs. In addition, U.S. EPA has established emission standards for mobile sources such as ships, trains, and airplanes. U.S. EPA has set National Ambient Air Quality Standards

(NAAQS) for six principal pollutants, which are called criteria air pollutants. Periodically, the standards are reviewed and may be revised. The current standards are listed below in Table A3. Units of measure for the standards are parts per million (ppm) by volume, parts per billion (ppb) by volume, and micrograms per cubic meter of air ($\mu\text{g}/\text{m}^3$).

2. California

CARB is California's lead air agency and controls emissions from mobile sources, fuels, and consumer products, as well as air toxics. CARB also coordinates local and regional emission reduction measures and plans that meet the NAAQS and California Ambient Air Quality Standards (CAAQS). CARB is charged with developing the state's State Implementation Plan (SIP), which details the state's plan to achieve the NAAQS and is submitted to U.S. EPA for review.

a) Criteria Air Pollutants

Concentrations of emissions of criteria air pollutants are used to indicate the quality of the ambient air because these are the most prevalent air pollutants known to be deleterious to human health. A brief description of each criteria air pollutant is provided below. Emission source types and health effects are summarized in Table A3.

Table A3: Sources and Health Effects of Criteria Air Pollutants			
Pollutant	Sources	Acute¹ Health Effects	Chronic² Health Effects
Ozone	Secondary pollutant resulting from reaction of reactive organic gases (ROG) and oxides of nitrogen (NO_x) in presence of sunlight. ROG emissions result from incomplete combustion and evaporation of chemical solvents and fuels; NO_x results from the combustion of fuels	Increased respiration and pulmonary resistance; cough, pain, shortness of breath, lung inflammation	Permeability of respiratory epithelia, possibility of permanent lung impairment
Carbon monoxide (CO)	Incomplete combustion of fuels; motor vehicle exhaust	Headache, dizziness, fatigue, nausea, vomiting, death	Permanent heart and brain damage
Nitrogen dioxide (NO_2)	Combustion devices; e.g., boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines	Coughing, difficulty breathing, vomiting, headache, eye irritation, chemical pneumonitis, or pulmonary edema; breathing abnormalities, cough, cyanosis, chest pain, rapid heartbeat, death	Chronic bronchitis and decreased lung function
Sulfur dioxide (SO_2)	Coal and oil combustion, steel mills, refineries, and pulp and paper mills	Irritation of upper respiratory tract, increased asthma symptoms	Insufficient evidence linking SO_2 exposure to chronic health impacts
Respirable particulate matter (PM_{10}) and fine	Fugitive dust, soot, smoke, mobile and stationary sources, construction, fires and natural windblown dust, and formation in the atmosphere by	Breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, premature death	Alterations to the immune system, carcinogenesis

Table A3: Sources and Health Effects of Criteria Air Pollutants

Pollutant	Sources	Acute¹ Health Effects	Chronic² Health Effects
particulate matter (PM _{2.5})	condensation and/or transformation of SO ₂ and ROG		
Lead	Metal processing	Reproductive/ developmental effects (fetuses and children)	Numerous effects including neurological, endocrine, and cardiovascular effects

¹ “Acute” refers to effects of short-term exposures to criteria air pollutants, usually at relatively high concentrations.

² “Chronic” refers to effects of long-term exposures to criteria air pollutants, even at relatively low concentrations.

Sources: U.S. EPA 2017.

b) Ozone

Ozone is a gas composed of three atoms of oxygen (O₃). Ozone occurs both in the Earth’s upper atmosphere (stratospheric) and at ground level (tropospheric). Stratospheric ozone occurs naturally in the upper atmosphere, where it forms a protective layer that shields us from the sun’s harmful ultraviolet rays. Tropospheric, or ground level ozone, is not emitted directly into the air, but is created by chemical reactions between oxides of nitrogen (NO_x) and volatile organic compounds (VOCs). This happens when pollutants emitted by cars, power plants, industrial boilers, refineries, chemical plants, and other sources chemically react in the presence of sunlight. Ozone at ground level is a harmful air pollutant, because of its effects on people and the environment, and it is the main ingredient in “smog” (U.S. EPA 2018).

c) Nitrogen Dioxide

NO₂ is a brownish, highly-reactive gas that is present in all urban environments. The major human-made sources of NO₂ are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO₂. The combined emissions of NO and NO₂ are referred to as NO_x and are reported as equivalent NO₂. Because NO₂ is formed and depleted by reactions associated with photochemical smog (ozone), the NO₂ concentration in a geographical area may not be representative of the local sources of NO_x emissions (U.S. EPA 2017).

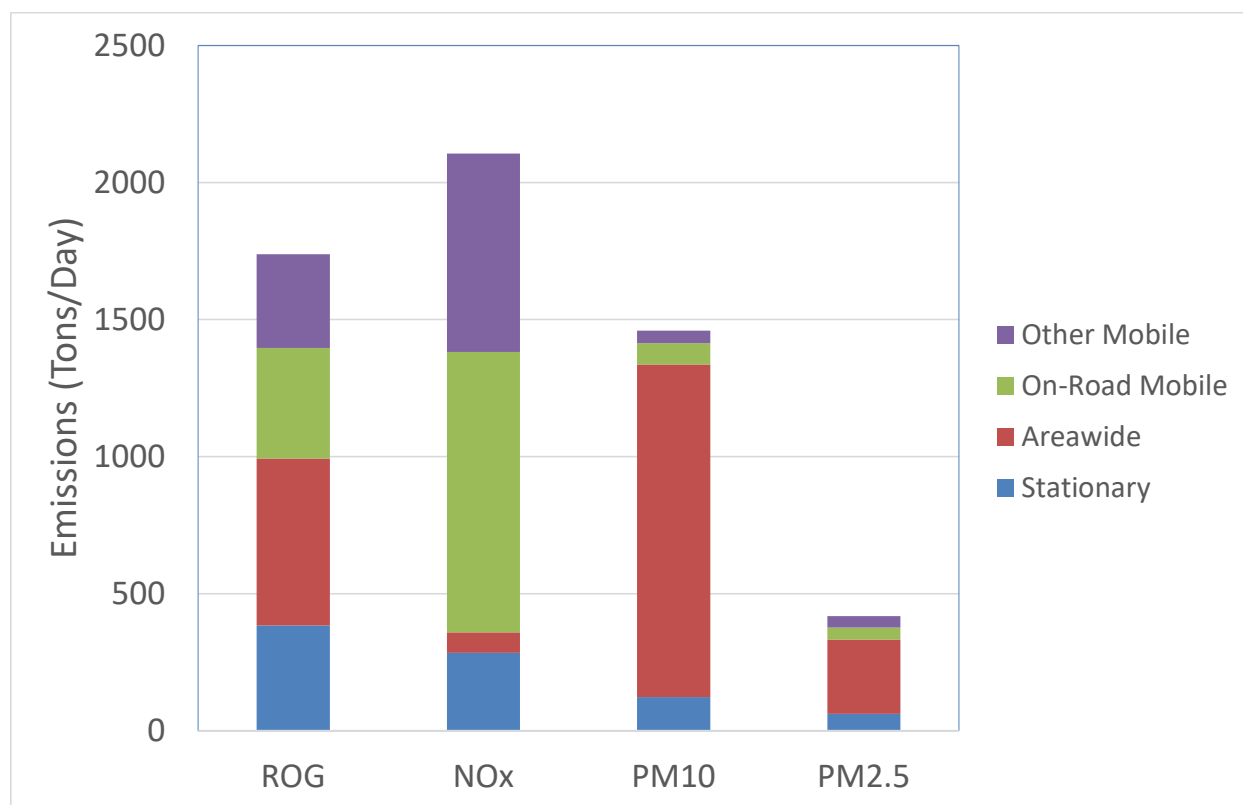
d) Particulate Matter

Respirable particulate matter with an aerodynamic diameter of 10 micrometers or less is referred to as PM₁₀. PM₁₀ consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources, construction equipment, fires and natural windblown dust, and particulate matter formed in the atmosphere by reaction of gaseous precursors (CARB 2009). PM_{2.5} includes a subgroup of smaller particles that have an aerodynamic diameter of 2.5 micrometers or less. PM₁₀ emissions in California are dominated by emissions from area sources, primarily fugitive dust from vehicle travel on

unpaved and paved roads, farming operations, construction and demolition, and particles from residential fuel combustion. Direct emissions of PM₁₀ have increased slightly in California over the last 20 years and are projected to continue. PM_{2.5} emissions have remained relatively steady over the last 20 years and are projected to increase slightly through 2020. Emissions of PM_{2.5} are dominated by the same sources as emissions of PM₁₀ (CARB 2009).

e) Emissions Inventory

Exhibit 1 summarizes emissions of criteria air pollutants within California for various source categories. According to California's emissions inventory, mobile sources are the largest contributor to the estimated annual average for air pollutant levels of ROG and NO_x accounting for approximately 43 percent and 83 percent, respectively, of the total emissions. Area wide sources account for approximately 83 percent and 65 percent of California's PM₁₀ and PM_{2.5} emissions, respectively (CARB 2013).



Source: CARB 2013.

Exhibit 1: California 2012 Emissions Inventory

f) Toxic Air Contaminants

Concentrations of toxic air contaminants (TACs) are also used to indicate the quality of ambient air. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually

present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations.

Today, the emissions from combustion of fuel in motor vehicles and off-road equipment are the primary source of air toxics risk in California. Particulate matter (PM) from diesel-fueled engines is a TAC and diesel PM accounts for approximately 60 percent of the current estimated inhalation cancer risk for background ambient air. Some examples of sources that contribute to higher potential health impacts from mobile diesel PM include freight hubs, like ports, rail yards and distribution centers. Because diesel PM cannot be directly measured in the ambient air, we use surrogate compounds and the emission inventory to estimate the ambient concentration. Both the combustion and evaporation of gasoline used in vehicles, lawn and garden equipment, recreational watercraft, and others produce other prevalent air toxics. Examples of stationary sources that also contribute to increased health risks to nearby residents include: metal finishing/manufacturing, chrome plating facilities, various product manufacturing (e.g., food, chemical, material, and etc.), stationary diesel engines (e.g., emergency backup generators), and refineries (CARB and CAPCOA 2015).

B. Regulatory Setting

Applicable laws and regulations associated with air quality are discussed in Table A4.

Table A4: Applicable Laws and Regulations for Air Quality	
Regulation	Description
Federal	
Clean Air Act (CAA) (42 U.S. Code (USC) Section 7401 et seq.; 40 CFR (e.g., Subchapter C- Air Programs, Subpart U- Air Emission Controls))	The CAA, which was last amended in 1990, requires U.S. EPA to set NAAQS for pollutants considered harmful to public health and the environment. The CAA established two types of NAAQS: primary standards set limits to protect public health, including the health of “sensitive” populations such as asthmatics, children, and the elderly; and secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. The U.S. EPA Office of Air Quality Planning and Standards has set NAAQS for criteria air pollutants. Title III of the CAA directed U.S. EPA to promulgate national emissions standards for Hazardous Air Pollutants (HAPs). The CAA also required U.S. EPA to promulgate vehicle or fuel standards containing reasonable requirements that control TAC emissions, at a minimum to benzene and formaldehyde. Performance criteria were established to limit mobile-source emissions of toxics, including benzene, formaldehyde, and 1,3-butadiene. In addition, Section 219 required the use of reformulated gasoline in selected areas with the most severe ozone nonattainment conditions to further reduce mobile-source emissions.
SmartWay	SmartWay is a U.S. EPA program that reduces transportation-related emissions by creating incentives to improve supply chain fuel efficiency. It aims to increase the availability and market penetration of fuel efficient technologies and strategies that help freight companies save money while also reducing adverse environmental impacts.
State	

Table A4: Applicable Laws and Regulations for Air Quality	
Regulation	Description
California Clean Air Act (CCAA) (Health and Safety Code, e.g., Division 26, (commencing with Section 39000 et seq.); California Code of Regulations (CCR) (Title 13, Division 3 (commencing with Section 1900 et seq.) and Title 17, Division 3 (commencing with Section 60000 et seq.))	CARB is the agency responsible for coordination and oversight of State and local air pollution control programs in California and for implementing the CCAA. The CCAA, which was adopted in 1988, required the CARB to the CAAQS.
Waste Heat and Carbon Emissions Reduction Act (Public Utilities Code Section 2840 et seq.)	The Act is designed to encourage the development of new combined heat and power (CHP) systems in California with a generating capacity of not more than 20 megawatts (MW). Section 2843 of the Act provides that the California Energy Commission's (CEC's) guidelines require that CHP systems: be designed to reduce waste energy; have a minimum efficiency of 60 percent; have NO _x emissions of no more than 0.07 pounds per megawatt-hour (MWh); be sized to meet the eligible customer generation thermal load; operate continuously in a manner that meets the expected thermal load and optimizes the efficient use of waste heat; be cost effective, technologically feasible, and environmentally beneficial.
Other Applicable State-Level Regulations	This includes all other applicable regulations at the State level for portions of the project area that are outside of California (e.g., Toxic Air Contaminant Identification and Control Act ((AB 1807) Tanner, Ch. 1047, Statutes of 1983 and Air Toxics "Hot Spots" Information and Assessment ((AB 2588), Connolly, Ch.1252, Stats. of 1987.).
Local	
Air Districts	Air Districts have primary responsibility for preparation, adoption, and implementation of mobile, stationary, and area emission control measures and for the preparation of the SIP and any amendments.

4. BIOLOGICAL RESOURCES

A. Existing Conditions

1. U.S.

The U.S. is composed of many different biological provinces, or biomes, including tundra, coniferous and deciduous forest, grassland, and desert. Each biome provides a sanctuary to a diverse variety of biological species. Scientists have documented more than 200,000 species in the U.S., representing more than 10 percent of the species worldwide (The Nature Conservancy 2002).

2. California

The state's geography and topography have created distinct local climates ranging from high rainfall in northwestern mountains to the driest place in North America, Death Valley. North to south, the state extends for almost 800 miles, bridging the temperate rainforests in the Pacific Northwest and the subtropical arid deserts of Mexico. Many parts of the state experience Mediterranean weather patterns, with cool, wet winters and hot, dry summers. Summer rain is indicative of the eastern mountains and deserts, driven by the western margin of the North American monsoon. Along the northern coast abundant precipitation and ocean air produces foggy, moist conditions. High mountains have cooler conditions, with a deep winter snow pack in normal climate years. Desert conditions exist in the rain shadow of the mountain ranges (CDFW 2015).

While the state is largely considered to have a Mediterranean climate, it can be further subdivided into six major climate types: Desert, Marine, Cool Interior, Highland, Steppe, and Mediterranean. California deserts, such as the Mojave, are typified by a wide range of elevation with more rain and snow in the high ranges, and hot, dry conditions in valleys. Cool Interior and Highland climates can be found on the Modoc Plateau, Klamath, Cascade, and Sierra ranges. Variations in slope, elevation, and aspect of valleys and mountains result in a range of microclimates for habitats and wildlife. For example, the San Joaquin Valley, exhibiting a Mediterranean climate, receives sufficient springtime rain to support grassland habitats, while still remaining hot and relatively dry in summer. Steppe climates include arid, shrub-dominated habitats that can be found in the Owens Valley, east of the Sierra Nevada, and San Diego, located in coastal southern California (CDFW 2015).

The Marine climate has profound influence over terrestrial climates, particularly near the coast. Additionally, the state is known for variability in precipitation because of the El Niño-Southern Oscillation (ENSO) and the Pacific Decadal Oscillation (PDO). Oscillations are the cyclical shifting of high and low-pressure systems, as evidenced by the wave pattern of the jet stream in the northern hemisphere. The ENSO is the cycle of air pressure systems influenced by the location of warm and cold sea temperatures. El Niño events occur when waters are warmer in the eastern Pacific Ocean, typically resulting in greater precipitation in southern California and less precipitation in northern California, and La Niña events occur when waters are colder in the eastern Pacific resulting in drier than normal conditions in southern California and wetter conditions in northern California during late summer and winter. The warmer ocean temperatures associated with El Niño conditions also result in decreased upwelling in the Pacific Ocean (CDFW 2015).

California has the highest numbers of native and endemic plant species of any state, with approximately 6,500 species, subspecies, and varieties of plants, representing 32 percent of all vascular plants in the United States. Nearly one-third of the state's plant species are endemic, and California has been recognized as one of 34 global hotspots for plant diversity. Within the California Floristic Province, which encompasses the Mediterranean area of Oregon, California, and northwestern Baja, 2,124 of the 3,488 species are endemic, representing a 61 percent rate of endemism. Over 200 species, subspecies, and varieties of

native plants are designated as rare, threatened, or endangered by state law, and over 2,000 more plant taxa are considered to be of conservation concern (CDFW 2015).

California has a large number of animal species, representing a substantial proportion of the wildlife species nationwide. The state's diverse natural communities provide a wide variety of habitat conditions for wildlife. The state's wildlife species include approximately 100 reptile species, 75 amphibian species, 650 bird species, and 220 mammal species. Additionally, 48 mammals, 64 birds, 72 amphibians and reptiles, and 20 freshwater fish live in California and nowhere else (CDFW 2015).

California exhibits a wide range of aquatic habitats from the Pacific Ocean to isolated hillside seeps, to desert oases that support both water-dependent species and provide essential seasonal habitat for terrestrial species. Perennial and ephemeral rivers and streams, riparian areas, vernal pools, and coastal wetlands support a diverse array of flora and fauna, including 150 animal and 52 plant species that are designated special-status species. The California Natural Diversity Database identifies 123 different aquatic habitat-types in California, based on fauna. Of these, 78 are stream habitat-types located in seven major drainage systems: Klamath, Sacramento-San Joaquin, North/Central Coast, Lahontan, Death Valley, South Coast, and Colorado River systems. These drainage systems are geologically separated and contain distinctive fishes and invertebrates. California has approximately 70 native resident and anadromous fish species, and 72 percent of the native freshwater fishes in California are either listed, or possible candidates for listing as threatened or endangered, or are extinct (CDFW 2015).

B. Regulatory Setting

Applicable laws and regulations associated with biological resources are discussed in Table A5.

Table A5: Applicable Laws and Regulations for Biological Resources	
Applicable Law	Description
Federal	
Federal Endangered Species Act (ESA) (16 USC Section 1531 et seq.)	The ESA designates and provides for protection of threatened and endangered plant and animal species, and their critical habitat. Two sections of the ESA address take of threatened and endangered species. Section 7 covers actions that would result in take of a federally-listed species and have a federal discretionary action. Section 10 regulates actions that would result in take of threatened or endangered species and a non-federal agency is the lead agency for the action. Section 10 of the ESA requires preparation of a habitat conservation plan (HCP). More than 430 HCPs have been approved nation-wide (U.S. Fish and Wildlife Service (USFWS) 2005).
Migratory Bird Treaty Act (MBTA) (16 USC Section 703 et seq.)	The MBTA makes it unlawful to take or possess any migratory nongame bird (or any part of such migratory nongame bird) as designated under the MBTA.
Clean Water Act (CWA) (33 USC Section 1251 et seq.)	The CWA requires the permitting and monitoring of all discharges to surface water bodies. Section 404 requires a permit from the U.S. Army Corps of Engineers (USACE) for a discharge from dredged or fill materials into Waters of

Table A5: Applicable Laws and Regulations for Biological Resources

Applicable Law	Description
	the U.S., including wetlands. Section 401 requires a permit from a regional water quality control board (RWQCB) for the discharge of pollutants. By federal law, every applicant for a federal permit or license for an activity that may result in a discharge into a California water body, including wetlands, must request State certification that the proposed activity would not violate State and federal water quality standards.
Rivers and Harbors Act of 1899	The Rivers and Harbors Act requires a permit or letter of permission from USACE prior to any work being completed within navigable waters.
U.S EPA Section 404 (b)(1) Guidelines	Section 404 requires USACE to analyze alternatives in a sequential approach such that USACE must first consider avoidance and minimization of impacts to the extent practicable to determine whether a proposed discharge can be authorized.
California Desert Conservation Area (CDCA) Plan	The CDCA Plan comprises one of two national conservation areas established by Congress in 1976. The FLPMA outlines how BLM would manage public lands. Congress specifically provided guidance for the management of the CDCA Plan and directed the development of the 1980 CDCA Plan.
Federal Noxious Weed Act of 1974 (P.L. 93-629) (7 USC 2801 et seq.; 88 Stat. 2148)	The Federal Noxious Weed Act establishes a federal program to control the spread of noxious weeds. Authority is given to the Secretary of Agriculture to designate plants as noxious weeds by regulation, and the movement of all such weeds in interstate or foreign commerce was prohibited except under permit.
Executive Order 13112, "Invasive Species," February 3, 1999	Executive Order 13112 mandates that federal agencies take actions to prevent the introduction of invasive species, provide for their control, and minimize the economic, ecological, and human health impacts that invasive species cause.
Executive Order 11988, "Floodplain Management," May 24, 1977	Executive Order 11988 requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.
Executive Order 11990, "Protection of Wetlands," May 24, 1977	Executive order 11990 requires all federal agencies to consider wetland protection as an important part of their policies and take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands.
Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds," January 10, 2001	Executive Order 13186 requires that each federal agency taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations develop and implement a Memorandum of Understanding (MOU) with USFWS that shall promote the conservation of migratory bird populations.
Bald and Golden Eagle Protection Act (16 USC Section 668 et seq.)	The Bald and Golden Eagle Protection Act declares it is illegal to take, possess, sell, purchase, barter, offer to sell or purchase or barter, transport, export or import a bald or golden eagle, alive or dead, or any part, nest or egg of these eagles unless authorized. Active nest sites are also protected from disturbance during the breeding season.
BLM Manual 6840 — Special Status Species Management	This policy establishes special status species policy on BLM land for plant and animal species and the habitats on which they depend. The policy refers to species designated by the BLM State Director as sensitive.
Listed Species Recovery Plans and Ecosystem Management Strategies	These plans and strategies provide guidance for the conservation and management of sufficient habitat to maintain viable populations of listed species and ecosystems. Relevant examples include, but are not limited to, the Desert Tortoise Recovery Plan, Flat-tailed Horned Lizard Rangewide

Table A5: Applicable Laws and Regulations for Biological Resources

Applicable Law	Description
	Management Strategy; Amargosa Vole Recovery Plan; and Recovery Plan for Upland Species of the San Joaquin Valley.
State	
California Endangered Species Act of 1984 (Fish and Game Code, section 2050 et seq.)	Protects California's rare, threatened, and endangered species.
Natural Community Conservation Planning (NCCP) Act 1991 (Fish and Game Code, section 2800 et seq.)	The primary objective of the NCCP Act is to conserve natural communities at the ecosystem level while accommodating compatible land use. An NCCP identifies and provides for the regional or area-wide protection of plants, animals, and their habitats, while allowing compatible and appropriate economic activity. There are currently 23 NCCPs that have been adopted or are in progress in California (CDFW 2017).
Porter-Cologne Water Quality Control Act (Water Code Sections 13000 et seq.)	The Porter-Cologne Water Quality Control Act requires that each of the nine RWQCBs prepare and periodically update basin plans for water quality control. Each basin plan sets forth water quality standards for surface water and groundwater and actions to control nonpoint and point sources of pollution to achieve and maintain these standards.
Keene-Nejedly California Wetlands Preservation Act (PRC Section 5810 et seq.)	California has established a successful program of regional, cooperative efforts to protect, acquire, restore, preserve, and manage wetlands. These programs include, but are not limited to, the Central Valley Habitat Joint Venture, the San Francisco Bay Joint Venture, the Southern California Wetlands Recovery Project, and the Inter-Mountain West Joint Venture.
California Wilderness Act (PRC Section 5093.30 et seq.)	The California Wilderness Act establishes a California wilderness preservation system that consists of State-owned areas to be administered for the use and enjoyment of the people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, provide for the protection of such areas, preserve their wilderness character, and provide for the gathering and dissemination of information regarding their use and enjoyment as wilderness.
Significant Natural Areas (Fish and Game Code section 1930 et seq.)	This policy designates certain areas such as refuges, natural sloughs, riparian areas, and vernal pools as significant wildlife habitat.
Protection of Birds and Nests (Fish and Game Code sections 3503 and 3503.5)	These policies protect California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Raptors (e.g., hawks and owls) are specifically protected.
Migratory Birds (Fish and Game Code section 3513)	This policy protects California's migratory birds by making it unlawful to take or possess any migratory nongame bird as designated in the MBTA or any part of such migratory nongame birds.
Fur-bearing Mammals (Fish and Game Code sections 4000 and 4002)	This policy lists fur-bearing mammals require a permit for take.
Fully Protected Species (Fish and Game Code sections 3511, 4700, 5050, and 5515)	These policies identify several amphibian, reptile, fish, bird, and mammal species that are Fully Protected. CDFW cannot issue a take permit for these species, except for take related to scientific research.
CEQA Guidelines Section 15380	CEQA defines rare species more broadly than the definitions for species listed under the State and federal Endangered Species Acts. Under Section 15830, species not protected through State or federal listing but nonetheless demonstrable as "endangered" or "rare" under CEQA should also receive

Table A5: Applicable Laws and Regulations for Biological Resources

Applicable Law	Description
	consideration in environmental analyses. Included in this category are many plants considered rare by the California Native Plant Society and some animals on the CDFW's Special Animals List.
Oak Woodlands (PRC Section 21083.4)	This policy requires counties to determine if a project within their jurisdiction may result in conversion of oak woodlands that would have a significant adverse effect on the environment. If the lead agency determines that a project would result in a significant adverse effect on oak woodlands, mitigation measures to reduce the significant adverse effect of converting oak woodlands to other land uses are required.
Lake and Streambed Alteration Agreement (Fish and Game Code section 1600 et seq.)	This policy regulates activities that may divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake in California designated by CDFW in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit. Impacts to vegetation and wildlife resulting from disturbances to waterways are also reviewed and regulated during the permitting process.
California Desert Native Plants Act of 1981 (Food and Agricultural Code Section 80001 et seq. and California Fish and Game Code sections 1925-1926)	The California Desert Native Plants Act protects non-listed California desert native plants from unlawful harvesting on both public and private lands in Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego counties. Unless issued a valid permit, wood receipt, tag, and seal by the commissioner or sheriff, harvesting, transporting, selling, or possessing specific desert plants is prohibited.
Food and Agriculture Code Section 403	CDFA is designated to prevent the introduction and spread of injurious insect or animal pests, plant diseases, and noxious weeds.
Noxious Weeds (Title 3, CCR Section 4500)	List of plant species that are considered noxious weeds.
Local	
Various City and County General Plans	General plans typically designate areas for land uses, guiding where new growth and development should occur while providing a plan for the comprehensive and long-range management, preservation, and conservation of and natural resources and open-space lands.
Various Local Ordinances	Local ordinances provide regulations for proposed projects for activities such as grading plans, erosion control, tree removal, protection of sensitive biological resources and open space.

5. CULTURAL RESOURCES

A. Existing Conditions

1. U.S.

Cultural resources include archaeological sites of prehistoric or historic origin, built or architectural resources older than 50 years, traditional or ethnographic resources, and fossil deposits of paleontological importance. America has a cultural heritage that dates to some 25,000–60,000 years ago, when the first known inhabitants of the land that would eventually become the U.S. crossed the Bering Land Bridge into Alaska.

All areas within the U.S. have the potential for yielding yet undiscovered archaeological and paleontological resources and undocumented human remains not interred in cemeteries or marked formal burials. These resources have the potential to contribute to our knowledge of the fossil record or local, regional, or national prehistory or history.

Archaeological resources include both prehistoric and historic remains of human activity. Built environment resources include an array of historic buildings, structures, and objects serving as a physical connection to America's past. Traditional or ethnographic cultural resources may include Native American sacred sites and traditional resources of any ethnic community that are important for maintaining the cultural traditions of any group. "Historical resources" is a term with defined statutory meaning and includes any prehistoric or historic archaeological site, district, built environment resource, or traditional cultural resource recognized as historically or culturally significant (PRC Section 21084.1; CEQA Guidelines Section 15064.5(a)).

Paleontological resources, including mineralized, partially mineralized, or unmineralized bones and teeth, soft tissues, shells, wood, leaf impressions, footprints, burrows, and microscopic remains, are more than 5,000 years old and occur mainly in Pleistocene or older sedimentary rock units.

2. California

a) Prehistoric Overview

California was occupied by different prehistoric cultures dating to at least 12,000 to 13,000 years ago. Evidence for the presence of humans during the Paleoindian Period prior to about 8,000 years ago is relatively sparse and scattered throughout the state; most surface finds of fluted Clovis or Folsom projectile points or archaeological sites left by these highly mobile hunter-gatherers are associated with Pleistocene lakeshores, the Channel Islands, or the central and southern California coast (Rondeau et al. 2007). Archaeological evidence from two of the Northern Channel Islands located off the coast from Santa Barbara indicates the islands were colonized by Paleoindian peoples at least 12,000 years ago, likely via seaworthy boats (Erlandson et al. 2007). By 10,000 years ago, inhabitants of this coastal area were using fishhooks, weaving cordage and basketry, hunting marine mammals and sea birds, and producing ornamental shell beads for exchange with people living in the interior of the State (Erlandson et al. 2007). This is the best record of early maritime activity in the Americas, and combined with the fluted points, indicates California was colonized by both land and sea during the Paleoindian period (Jones and Klar 2007).

With climate changes between 10,000 and 7,000 years ago at the end of the Pleistocene and into the early Holocene, Lower Archaic peoples adjusted to the drying of pluvial lakes, rise in sea level, and substantial alterations in vegetation communities. Approximately 6,000 years ago, vegetation communities like those of the present were established in the majority of the state, while the changes in sea level also affected the availability of estuarine resources (Jones and Klar 2007). The archaeological record indicates subsistence patterns during the Lower Archaic and subsequent Middle Archaic Period shifted to an increased emphasis on plant resources, as evidenced by an abundance of milling implements in archaeological sites dating between 8,000 and 3,000 years ago.

Approximately 3,000 years ago, during the Upper Archaic and Late Prehistoric Periods, the complexity of the prehistoric archaeological record reflects increases in specialized adaptations to locally available resources such as acorns and salmon, in permanently occupied settlements, and in the expansion of regional populations and trade networks (Moratto 1984; Jones and Klar 2007). During the Upper Archaic, marine shell beads and obsidian continue to be the hallmark of long-distance trade and exchange networks developed during the preceding period (Hughes and Milliken 2007). Large shell midden/mounds at coastal and inland sites in central and southern California, for example, attest to the regular reuse of these locales over hundreds of years or more from the Upper Archaic into the Late Prehistoric period. In the San Francisco Bay region alone, over 500 shell mounds were documented in the early 1900s (Moratto 1984).

Changes in the technology used to pursue and process resources are some of the hallmarks of the Late Prehistoric period. These include an increase in the prevalence of mortars and pestles, a diversification in types of watercraft and fishhooks, and the earliest record for the bow and arrow in the State that occurs in both the Mojave Desert and northeast California nearly 2,000 years ago (Jones and Klar 2007). The period also witnessed the beginning of ceramic manufacture in the southeast desert region, southwest Great Basin, and parts of the Central Valley.

During the Late Prehistoric period, the development of social stratification and craft specialization accompanied the increase in sedentism, as indicated by the variety of artifacts, including bone tools, coiled and twined basketry, obsidian tools, marine shell beads, personal ornaments, pipes, and rattles, by the use of clamshell disk beads and strings of dentalium shell as a form of currency, and by variation in burial types and associated grave goods (Moratto 1984; Jones and Klar 2007). Pictographs, painted designs that are likely less than 1,000 years old, and other non-portable rock art created during this period likely had a religious or ceremonial function (Gilreath 2007). Osteological evidence points to intergroup conflict and warfare in some regions during this period, and there also appears to have been a decline or disruption in the long-distance trade of obsidian and shell beads approximately 1,200 years ago in parts of the State (Jones and Klar 2007; Hughes and Milliken 2007).

b) Ethnographic Overview

At the time of European contact, California was the home of approximately 310,000 indigenous peoples with a complex of cultures distinguished by linguistic affiliation and territorial boundaries (Kroeber 1925; Cook 1978; Heizer 1978; Ortiz 1983; d'Azevedo 1986). At least 70 distinct native Californian cultural groups, with even more subgroups, inhabited the vast lands within the state. The groups and subgroups spoke between 74 and 90 languages, plus a large number of dialects (Shipley 1978:80).

In general, these mainly sedentary, complex hunter-gatherer groups of indigenous Californians shared similar subsistence practices (hunting, fishing, and collecting plant foods), settlement patterns, technology, material culture, social organization, and religious beliefs (Kroeber 1925; Heizer 1978; Ortiz 1983; d'Azevedo 1986). Permanent villages were situated along the coast, interior waterways, and near lakes and wetlands. Population density among these groups varied, depending mainly on availability and dependability of local resources, with the highest

density of people in the northwest coast and Santa Barbara Channel areas and the least in the state's desert region (Cook 1976). Networks of foot trails were used to connect groups to hunting or plant gathering areas, rock quarries, springs or other water sources, villages, ceremonial places, or distant trade networks (Heizer 1978).

The social organization of California's native peoples varied throughout the state, with villages or political units generally organized under a headman who was also the head of a lineage or extended family or achieved the position through wealth (Bean 1978). For some groups, the headman also functioned as the religious ceremonial leader. Influenced by their Northwest Coast neighbors, the differential wealth and power of individuals was the basis of social stratification and prestige between elites and commoners for the Chilula, Hupa, Karok, Tolowa, Wiyot, and Yurok in the northwest corner of the state. Socially complex groups were also located along the southern California coast where differential wealth resulted in hierarchical classes and hereditary village chiefs among the Chumash, Gabrielino, Juaneño, and Luiseño (Bean and Smith 1978; Arnold and Graesch 2004).

At the time of Spanish colonialization, there were numerous religious practices among native Californian groups (Dutschke 1988). Many of the indigenous groups in the north-central part of the State practiced the Kuksu cult, practicing ceremonies and dances with a powerful shaman as the leader. Log drums, flutes, rattles, and whistles accompanied the elaborate ceremonial dances. The World Renewal cult in the northwestern corner of the State extended as far north as Alaska and was funded by the wealthy class. It entailed a variety of annual rites to prevent natural disasters and maintain natural resources and individual health. The Toloache cult was widespread in central and southern California and involved the use of narcotic plant materials (commonly known as datura or jimsonweed) to facilitate the acquisition of power. On the southern coast among Takic-speaking groups, the basis of Gabrielino, Juaneño and Luiseño religious life was the Chinigchinich cult, which appeared to have developed from the Toloache cult. Chinigchinich, the last of a series of heroic mythological figures, gave instruction on laws and institutions, taught people how to dance, and later withdrew into heaven where he rewarded the faithful and punished those who disobeyed his laws. The Chinigchinich religion seems to have been relatively new when the Spanish arrived, and could have been influenced by Christianity.

Trade and exchange networks were a significant part of the economy and social organization among California's Native American groups (Heizer 1978). Obsidian, steatite, beads, acorns, baskets, animal skins, and dried fish were among the variety of traded commodities. Inland groups supplied obsidian from sources along the Sierra Nevada Mountains, in Napa Valley, and in the northeast corner of the state. Coastal groups supplied marine shell beads, ornaments, and marine mammal skins. In addition to trading specific items, clamshell disk beads made from two clam species available on the Pacific coast were widely used as a form of currency (Kroeber 1922). In northwestern California, groups used strings of dentalium shell as currency.

The effect of Spanish settlement and missionization in California marks the beginning of a devastating disruption of native culture and life ways, with forced population movements, loss of land and territory (including traditional hunting and gathering locales), enslavement, and

decline in population numbers from disease, malnutrition, starvation, and violence during the historic period (Castillo 1978). In the 1830s, foreign disease epidemics swept through the densely populated Central Valley, adjacent foothills, and North Coast Ranges decimating indigenous population numbers (Cook 1978). By 1850, with their lands, resources and way of life being overrun by the steady influx of non-native people during the Gold Rush, California's native population was reduced to about 100,000. By 1900, there were only 20,000 or less than seven percent of the pre-contact number. Existing reservations were created in California by the federal government beginning in 1858 but encompass only a fraction of native lands.

In 2018, the Native American population in California was estimated at over 672,123 (U.S. Census Bureau (Census) 2018). Although acknowledged as non-federally recognized California Native American tribes on the contact list maintained by the Native American Heritage Commission (NAHC), many groups continue to await federal tribal status recognition. There are currently 164 federally and non-federally recognized tribes within the state (NAHC 2018:15). Members of these tribes have specific cultural beliefs and traditions with unique connections to areas of California that are their ancestral homelands.

c) Historic Overview

Post-contact history for the State is generally divided into the Spanish period (1769–1822), Mexican period (1822–1848), and American period (1848–present). The establishment of Fort Ross by Alaska-based Russian traders also influenced post-contact history for a short period (1809–1841) in the region north of San Francisco Bay. Although there were brief visits along the Pacific coast by European explorers (Spanish, Russian, and British) between 1529 and 1769 of the territory claimed by Spain, the expeditions did not journey inland.

i) Spanish Period (1769–1822)

Spain's colonization of California began in 1769 with the overland expeditions from San Diego to San Francisco Bay by Lt. Colonel Gaspar de Portolá, and the establishment of a mission and settlement at San Diego. Between 1769 and 1823, the Spanish and the Franciscan Order established a series of 21 missions paralleling the coast along El Camino Real between San Diego and Sonoma (Rolle 1969). Between 1769 and 1782, Spain built four presidios (i.e., San Diego, Monterey, San Francisco, and Santa Barbara) to protect the missions, and by 1871 had established two additional pueblos at Los Angeles and San José.

Under Spanish law, large tracts of land, including cattle ranches and farms, fell under the jurisdiction of the missions. Native Americans were removed from their traditional lands, converted to Christianity, concentrated at the missions, and used as labor on the mission farms and ranches (Castillo 1978). Since the mission friars had civil as well as religious authority over their converts, they held title to lands in trust for indigenous groups. The lands were to be repatriated once the native peoples learned Spanish laws and culture.

ii) Russian Period (1809–1841)

In 1809, Russian fur-traders started exploring the northern California coast with the goal of hunting sea otters and farming, to support their settlements in Alaska. The first Russian settlement was established in 1811–1812 by the Russian–American Fur Company to protect the lucrative marine fur trade and to grow produce for their Alaskan colonies. Not all Russians

stayed in California for the fur trade partly due to declined sea otter population and also to settler resistance (Schuyler 1978; Oakland Museum of California).

iii) Mexican Period (1822–1848)

Following independence from Spain in 1822, the economy during the Mexican period depended on the extensive rancho system, carved from the former Franciscan missions and at least 500 land grants awarded in the State's interior to Mexican citizens (Beck and Haase 1974; Staniford 1975). Captain John Sutter, who became a Mexican citizen, received the two largest land grants in the Sacramento Valley. In 1839, Sutter founded the trading and agricultural empire named New Helvetia that was headquartered at Sutter's Fort, near the confluence of the Sacramento and American Rivers in today's City of Sacramento (Hoover et al. 2002).

Following adoption of the Secularization Act of 1833, the Mexican government privatized most Franciscan lands, including holdings of their California missions. Although secularization schemes had called for redistribution of lands to Native American neophytes who were responsible for construction of the mission empire, the vast mission lands and livestock holdings were instead redistributed by the Mexican government through several hundred land grants to private, non-indigenous ranchers (Castillo 1978; Hoover et al. 2002). Most Native American converts returned to traditional lands that had not yet been colonized or found work with the large cattle ranchos being carved out of the mission lands.

iv) American Period (1848–present)

In 1848, shortly after California became a territory of the U.S. with the signing of the Treaty of Guadalupe Hidalgo ending Mexican rule, gold was discovered on the American River at Sutter's Mill in Coloma. The resulting Gold Rush era influenced the history of the State, the nation, and the world. Thousands of people flocked to the gold fields in the Mother Lode region that stretches along the western foothills of the Sierra Nevada Mountains, and to the areas where gold was also discovered in other parts of the State, such as the Klamath and Trinity River basins (California Department of Transportation (Caltrans) 2008). In 1850, California became the 31st state, largely as a result of the Gold Rush.

d) Paleontological Setting

California's fossil record is exceptionally prolific with abundant specimens representing a diverse range of marine, lacustrine, and terrestrial organisms recovered from Precambrian rocks as old as 1 billion years to as recent as 6,000-year-old Holocene deposits (refer to geologic timescale in Table A6). These fossils provide key data for charting the course of the evolution or extinction of a variety of life on the planet, both locally and internationally. Paleontological specimens also provide key evidence for interpreting paleoenvironmental conditions, sequences and timing of sedimentary deposition, and other critical components of the earth's geologic history. Fossils are considered our most significant link to the biological prehistory of the earth (Jefferson 2004).

Table A6: Divisions of Geologic Time

Era	Period	Time in Millions of Years Ago (approximately)	Epoch
Cenozoic	Quaternary	< 0.01	Holocene
		2.6	Pleistocene
	Tertiary	5.3	Pliocene
		23	Miocene
		34	Oligocene
		56	Eocene
		65	Paleocene
Mesozoic	Cretaceous	145	
	Jurassic	200	
	Triassic	251	
Paleozoic	Permian	299	
	Carboniferous	359	
	Devonian	416	
	Silurian	444	
	Ordovician	488	
	Cambrian	542	
Precambrian		2,500	
Source: U.S. Geological Survey 2010.			

Because the majority of the State was underwater until the Tertiary period, marine fossils older than 65 million years are not common and are exposed mainly in the mountains along the border with Nevada and the Klamath Mountains, and Jurassic shales, sandstones, and limestones are exposed along the edges of the Central Valley, portions of the Coast, Transverse, and Peninsular Ranges, and the Mojave and Colorado Deserts. Some of the oldest fossils in the state, extinct marine vertebrates called conodonts, have been identified at Anza-Borrego Desert State Park in Ordovician sediments dating to circa 450 million years ago. Limestone outcrops of Pennsylvanian and Permian in the Providence Mountains State Recreation Area contain a variety of marine life, including brachiopods, fusulinids, crinoids, that lived some 300 to 250 million years ago.

Fossils from the Jurassic sedimentary layers in San Joaquin, San Luis Obispo, and Stanislaus counties include ammonites, bivalves, echinoderms, and marine reptiles, all of which were common in the coastal waters. Gymnosperms (seed-bearing plants) such as cycads, conifers, and ginkgoes are preserved in terrestrial sediments from this period, evidence that the Jurassic climate was warm and moderately wet. In the great Central Valley, marine rocks record the position of the Cretaceous shoreline as the eroded ancestral Sierra Nevada sediments were deposited east of the rising Coast Ranges and became the rock layers of the Sacramento and San Joaquin valleys. These Cretaceous sedimentary deposits have yielded

abundant fossilized remains of plants, bivalves, ammonites, and marine reptiles (Paleontology Portal 2003).

Along coastal southern California where steep coastal mountains plunged into the warm Pacific Ocean an abundance of fossil marine invertebrates, such as ammonites, nautilus, tropical snails, and sea stars, have been found in today's coastal and near-coastal deposits from the Cretaceous Period. A rare armored dinosaur fossil dated to about 75 million years ago during the Cretaceous was discovered in San Diego County during a highway project. It is the most complete dinosaur skeleton ever found in California (San Diego Natural History Museum 2010). The lack of fossil remains of the majority of earth's large vertebrates, particularly terrestrial, marine, and flying reptiles (dinosaurs, ichthyosaurs, mosasaurs, pleisosaurs, and pterosaurs), as well as many species of terrestrial plants, after the end of the Cretaceous and the start of the Tertiary periods 65 million years ago (the K-T boundary) attests to their abrupt extinction.

B. Regulatory Setting

Applicable laws and regulations associated with cultural resources are discussed in Table A7.

Table A7: Applicable Laws and Regulations for Cultural Resources	
Applicable Regulation	Description
Federal	
NHPA of 1966	The NHPA requires federal agencies to consider the preservation of historic and prehistoric resources. The NHPA authorizes the Secretary of the Interior to expand and maintain a National Register of Historic Places (NRHP), and it establishes an Advisory Council on Historic Preservation (ACHP) as an independent federal entity. Section 106 of the NHPA requires federal agencies to consider the effects of their undertakings on historic properties and afford the ACHP a reasonable opportunity to comment on the undertaking prior to licensing or approving the expenditure of funds on any undertaking that may affect properties listed, or eligible for listing, in the NRHP.
National Environmental Policy Act (NEPA) of 1969	NEPA requires federal agencies to foster environmental quality and preservation. Section 101(b)(4) declares that one objective of the national environmental policy is to "preserve important historic, cultural, and natural aspects of our national heritage." For major federal actions significantly affecting environmental quality, federal agencies must prepare, and make available for public comment, an environmental impact statement.
Archaeological Resources Protection Act of 1979 (NRPA) (16 USC Sections 470aa-470ll)	The NRPA requires a permit for any excavation or removal of archaeological resources from public lands or Indian lands. The statute provides both civil and criminal penalties for violation of permit requirements and for excavation or removal of protected resources without a permit.
Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (PL 101-601) (25 USC Section 3001 et seq.)	The NAGPRA vests ownership or control of certain human remains and cultural items excavated or discovered on federal or tribal lands, in designated Native American tribes, organizations, or groups. The NAGPRA further requires notification of the appropriate Secretary or other head of any federal agency upon the discovery of Native American cultural items on federal or tribal lands; proscribes trafficking in Native American human remains and cultural items; requires federal

Table A7: Applicable Laws and Regulations for Cultural Resources

Applicable Regulation	Description
	agencies and museums to compile an inventory of Native American human remains and associated funerary objects, and to notify affected Indian tribes of this inventory; and provides for the repatriation of Native American human remains and specified objects possessed or controlled by federal agencies or museums.
Advisory Council Regulation, Protection of Historic Properties (36 CFR Part 800)	This regulation establishes procedures for compliance with Section 106 of the NHPA. These regulations define the Criteria of Adverse Effect, define the role of State Historic Preservation Officer (SHPO) in the Section 106 review process, set forth documentation requirements, and describe procedures to be followed if significant historic properties are discovered during implementation of an undertaking. Prehistoric and historic resources deemed significant (i.e., eligible for listing in the NRHP, per 36 CFR 60.4) must be considered in project planning and construction. The responsible federal agency must submit any proposed undertaking that may affect NRHP-eligible properties to the SHPO for review and comment prior to project approval.
National Park Service Regulations, NRHP (36 CFR Part 60)	These regulations set forth procedures for nominating properties to the NRHP and present the criteria to be applied in evaluating the eligibility of historic and prehistoric resources for listing in the NRHP.
Archaeology and Historic Preservation; Secretary of the Interior's Standards and Guidelines (Federal Register (FR) 190:44716–44742)	Non-regulatory technical advice about the identification, evaluation, documentation, study, and other treatment of cultural resources. Notable in these Guidelines are the “Standards for Archaeological Documentation” (p. 44734) and “Professional Qualifications Standards for Archaeology” (pp. 44740–44741).
American Indian Religious Freedom Act of 1978	The American Indian Religious Freedom Act pledges to protect and preserve the traditional religious rights of American Indians, Aleuts, Eskimos, and Native Hawaiians. Before the act was passed, certain federal laws interfered with the traditional religious practices of many American Indians. The Act establishes a national policy that traditional Native American practices and beliefs, sites (and right of access to those sites), and the use of sacred objects shall be protected and preserved.
Department of Transportation Act of 1966 Section 4(f)	Section 4(f) of the Act requires a comprehensive evaluation of all environmental impacts resulting from federal-aid transportation projects administered by the Federal Housing Administration (FHA), Federal Transit Administration (FTA), and Federal Aviation Administration (FAA) that involve the use—or interference with use—of several types of land: public park lands, recreation areas, and publicly or privately owned historic properties of federal, state, or local significance. The Section 4(f) evaluation must be sufficiently detailed to permit the U.S. Secretary of Transportation to determine that there is no feasible and prudent alternative to the use of such land, in which case the project must include all possible planning to minimize harm to any park, recreation, wildlife and waterfowl refuge, or historic site that would result from the use of such lands. If there is a feasible and prudent alternative, a proposed project using Section 4(f) lands cannot be approved by the Secretary. Detailed inventories of the locations and likely impacts on resources that fall into the Section 4(f) category are required in project-level environmental assessments.

Table A7: Applicable Laws and Regulations for Cultural Resources

Applicable Regulation	Description
State	
Health and Safety Code Sections 7052 and 7050.5 and PRC Section 5097.98	Disturbance of human remains without the authority of law is a felony (Health and Safety Code Section 7052). According to State law (Health and Safety Code Section 7050.5; PRC Section 5097.98), if human remains are discovered or recognized in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until 1) the coroner of the county has been informed and has determined that no investigation of the cause of death is required; 2) and if the remains are of Native American origin, and if the descendants from the deceased Native Americans have made a recommendation to the landowner or the person responsible for the excavation work for means of treating or disposing of with appropriate dignity the human remains and any associated grave goods as provided in PRC Section 5097.98; or the Native American Heritage Commission was unable to identify a descendent or the descendent failed to make a recommendation within 24 hours after being notified by the Commission. According to the Health and Safety Code, six or more human burials at one location constitute a cemetery (Health and Safety Code Sections 8100 and 7003), and disturbance of Native American cemeteries is a felony (Health and Safety Code Section 7052). Section 7050.5 requires that construction or excavation be stopped near discovered human remains until the coroner can determine whether the remains are those of a Native American. If the remains are determined to be Native American, the coroner must contact the Native American Heritage Commission, who has jurisdiction over Native American remains (Health and Safety Code 7050.5(c); PRC Section 5097.98).
CEQA (Guidelines Section 15380)	CEQA requires that public agencies financing or approving public or private projects must assess the effects of the project on cultural resources. Furthermore, it requires that, if a project results in significant impacts on important cultural resources, alternative plans or mitigation measures must be considered; only significant cultural resources, however, need to be addressed. Thus, prior to the development of mitigation measures, the importance of cultural resources must be determined.
Assembly Bill (AB) 52 (Statutes of 2014)	AB 52 (Gatto, Chapter 532, Statutes of 2014) recognizes that tribal sovereignty and the unique relationship of California local governments and public agencies with California Native American tribal governments, while respecting the interests and roles of project proponents. This requires specific consultation processes for project review and approval.
Local	
City/County General Plans	Policies, goals, and implementation measures in county or city general plans may contain measures applicable to cultural and paleontological resources. In addition to the enactment of local and regional preservation ordinances, CEQA requires that resources included in local registers be considered (local register of historical resources is defined in PRC Section 5020.1(k)). Therefore, local county and municipal policies, procedures, and zoning ordinances must be considered in the context of project-specific undertakings. Cultural resources are generally discussed in either the open space element or the conservation element of the general plan. Many local municipalities include cultural resources preservation elements in their general plans that include some mechanism pertaining to cultural resources in those communities. In general, the sections pertaining to archaeological and historical properties are put in place to afford the cultural resources a measure of

Table A7: Applicable Laws and Regulations for Cultural Resources

Applicable Regulation	Description
	local protection. The policies outlined in the individual general plans should be consulted prior to any undertaking or project.
Cooperative Agreements Among Agencies	Cooperative agreements among land managing agencies (BLM, National Park Service (NPS), USFS, California State Parks (CSP), Bureau of Indian Affairs, Department of Defense, and others) the SHPO and ACHP may exist and will need to be complied with on specific projects. In addition, certain agencies have existing Programmatic Agreements requiring permits (California Public Utilities Commission (CPUC), BLM) to complete archaeological investigations and employ the Secretary of Interior's Professional Qualification Standards and Guidelines (36 CFR Part 61).

6. ENERGY DEMAND

A. Existing Conditions

1. U.S.

Petroleum, natural gas, coal, renewable energy, and nuclear electric power are primary energy sources. Electricity is a secondary energy source that is generated from primary energy sources. In 2016, U.S. energy mix comprised of (U.S. Energy Information Administration (EIA) 2017a):

- Petroleum 37 percent,
- Natural Gas 29 percent,
- Coal 15 percent,
- Renewable Energy 10 percent, and
- Nuclear Electric Power 9 percent.

Energy sources are measured in different physical units: liquid fuels in barrels or gallons, natural gas in cubic feet, coal in short tons, and electricity in kilowatts and kilowatt-hours. In the U.S., British thermal units (Btu), a measure of heat energy, is commonly used for comparing different types of energy to each other. In 2016, total U.S. primary energy consumption was about 97.4 quadrillion (10¹⁵, or one thousand trillion) Btu (EIA 2017a).

In 2016, the shares of total primary energy consumption for the five energy-consuming sectors were (EIA 2017a):

- Electric power—39 percent,
- Transportation—29 percent,

- Industrial—22 percent,
- Residential—6 percent, and
- Commercial—4 percent.

The three major fossil fuels (i.e., petroleum, natural gas, and coal) have dominated the U.S. energy mix for more than 100 years. Several recent changes in U.S. energy production have occurred (EIA 2017a):

- Coal production peaked in 2008 and trended down through 2016. Coal production in 2016 was about the same as production was in 1977. The primary reason for the general decline in coal production in recent years is the decrease in coal consumption for electricity generation.
- Natural gas production in 2016 was the second largest amount after the record high production in 2015. More efficient and cost-effective drilling and production techniques have resulted in increased production of natural gas from shale formations.
- Crude oil production generally decreased each year between 1970 and 2008. In 2009, the trend reversed, and production began to rise. More cost-effective drilling and production technologies helped to boost production, especially in Texas and North Dakota. In 2016, crude oil production was lower than production in 2015, mainly because of lower global crude oil prices.
- Natural gas plant liquids (NGPL) are hydrocarbon gas liquids that are extracted from natural gas before the natural gas is put into pipelines for transmission to consumers. NGPL production has increased alongside increases in natural gas production. In 2016, NGPL production reached a record high.
- Total renewable energy production and consumption both reached record highs of about 10 quadrillion Btu in 2016. Hydroelectric power production in 2016 was about 12 percent below the 50-year average but increases in energy production from wind and solar helped to increase the overall energy production from renewable sources. Energy production from wind and solar were at record highs in 2016.

2. California

California's total energy consumption ranks among the highest in the nation, but, in 2015, the state's per capita energy consumption ranked 49th, due in part to its mild climate and its energy efficiency programs. Excluding federal offshore areas, California was the third-largest producer of petroleum among the 50 states in 2016, after Texas and North Dakota, and, as of January 2017, third in oil refining capacity, with a combined capacity of almost 2 million barrels per calendar day at the state's 18 operable refineries. In 2016, California ranked third in the nation in conventional hydroelectric generation, second in net electricity generation from all

other renewable energy resources combined, and first as a producer of electricity from solar, geothermal, and biomass resources. California leads the nation in solar thermal electricity capacity and generation. In 2016, California had 73 percent of the nation’s capacity and produced 71 percent of the nation’s utility-scale electricity generation from solar thermal resources (EIA 2017b).

In 2016, California’s in-state electricity generation sources consisted of: 44.3 percent natural gas, 26.2 percent renewable sources, 9.5 percent nuclear, 12.3 percent large hydropower, and 0.2 percent from coal. Approximately 63 percent of total electricity generation was from in-state sources, with the remaining electricity coming from out-of-state imports from the Pacific Northwest (12 percent) and the Southwest (21 percent) (CEC 2017).

B. Regulatory Setting

Applicable laws and regulations associated with energy resources are discussed in Table A8.

Table A8: Applicable Laws and Regulations for Energy Resources	
Regulation	Description
Federal	
Energy Policy and Conservation Act of 1975	<p>The Energy Policy and Conservation Act of 1975 sought to ensure that all vehicles sold in the U.S. would meet certain fuel economy goals. Through this Act, Congress established the first fuel economy standards for on-road motor vehicles in the U.S. Pursuant to the Act, the National Highway Traffic and Safety Administration (NHTSA), which is part of the U.S. Department of Transportation (DOT), is responsible for establishing additional vehicle standards and for revising existing standards.</p> <p>From 1986 to 2012, fuel economy standards for passenger vehicles remained nearly stagnant at between 20.7 miles per gallon (mpg) for trucks and 27.5 mpg for light-duty cars. In 2010, U.S. EPA adopted new passenger vehicle standards starting with the 2012 model year that incorporates greenhouse gas (GHG) emissions standards on a vehicle-footprint basis and to accommodate the efficiencies of electric and other alternatively fueled vehicles. Additional standards for model years through 2025 were adopted in 2012. Translating the GHG standards to mpg equivalents, the projected fuel economy standard for new passenger cars and light trucks combined would increase from 30.1 to 54.5 between 2012 and 2025 model years. Until 2010, heavy-duty vehicles (i.e., vehicles and trucks over 8,500 pounds gross vehicle weight) were not subject to fuel economy standards. In 2011, NHTSA and U.S. EPA released fuel economy standards for medium- and heavy-duty vehicles (over 8,500 pounds gross vehicle weight) for 2014 through 2018 model years. Fuel economy standards for these vehicles vary by vehicle profession and include explicit mpg goals as well as percent reduction targets. In 2016, NHTSA and U.S. EPA adopted new standards for medium- and heavy-duty vehicles for 2018 through 2027 that would achieve GHG emissions reductions of approximately 1.1 billion metric tons (U.S. EPA 2016).</p> <p>Compliance with federal fuel economy standards is determined on the basis of each manufacturer’s average fuel economy for the portion of its vehicles produced for sale in the U.S. The Corporate Average Fuel Economy (CAFE) program, administered by U.S. EPA, was created to determine vehicle manufacturers’</p>

Table A8: Applicable Laws and Regulations for Energy Resources	
Regulation	Description
	compliance with the fuel economy standards. U.S. EPA calculates a CAFE value for each manufacturer based on city and highway fuel economy test results and vehicle sales. Based on the information generated under the CAFE program, DOT is authorized to assess penalties for noncompliance.
Energy Policy Act (EPA) of 1992	The EPA was passed to reduce the country's dependence on foreign petroleum and improve air quality. The EPA includes several parts intended to build an inventory of alternative fuel vehicles (AFVs) in large, centrally fueled fleets in metropolitan areas. The EPA requires certain federal, state, and local government and private fleets to purchase a percentage of light-duty AFVs capable of running on alternative fuels each year. In addition, financial incentives are included in the EPA. Federal tax deductions will be allowed for businesses and individuals to cover the incremental cost of AFVs. States are also required by the act to consider a variety of incentive programs to help promote AFVs.
Energy Policy Act of 2005	The Energy Policy Act of 2005 was signed into law on August 8, 2005. Generally, the act provides for renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing, tax incentives, grants, and loan guarantees for a clean renewable energy and rural community electrification; and establishes a federal purchase requirement for renewable energy.
State	
Warren-Alquist State Energy Resources Conservation and Development Act of 1974 (PRC Section 25000 et seq.)	The Warren-Alquist Act is the legislation that created and gives statutory authority to CEC (formally called the State Energy Resources Conservation and Development Commission).
Integrated Energy Policy Reports (Senate Bill (SB) 1389)	SB 1389 (Bowen, Chapter 568, Statutes of 2002) requires CEC to prepare a biennial integrated energy policy report that contains an assessment of major energy trends and issues facing the state's electricity, natural gas, and transportation fuel sectors and provides policy recommendations to conserve resources; protect the environment; ensure reliable, secure, and diverse energy supplies; enhance the state's economy; and protect public health and safety (PRC Section 25301(a)). CEC prepares these assessments and associated policy recommendations every 2 years, with updates in alternate years, as part of the Integrated Energy Policy Report (IEPR). Preparation of the IEPR involves close collaboration with federal, state, and local agencies and a wide variety of stakeholders in an extensive public process to identify critical energy issues and develop strategies to address those issues (CEC 2012).
California Long-Term Energy Efficiency Strategic Plan	On September 18, 2008, CPUC adopted California's first Long Term Energy Efficiency Strategic Plan, presenting a single roadmap to achieve maximum energy savings across all major groups and sectors in California. This comprehensive plan for 2009 to 2020 is the state's first integrated framework of goals and strategies for saving energy, covering government, utility, and private sector actions, and holds energy efficiency to its role as the highest priority resource in meeting California's energy needs. The plan was updated in January 2011 to include a lighting chapter.
Energy Action Plan	The first Energy Action Plan (EAP) emerged in 2003 from a crisis atmosphere in California's energy markets. The State's

Table A8: Applicable Laws and Regulations for Energy Resources	
Regulation	Description
	three major energy policy agencies (CEC, CPUC, and the Consumer Power and Conservation Financing Authority (established under deregulation and now defunct)) came together to develop one high-level, coherent approach to meeting California's electricity and natural gas needs. It was the first time that energy policy agencies formally collaborated to define a common vision and set of strategies to address California's future energy needs and emphasize the importance of the impacts of energy policy on the California environment.
California Building Energy Efficiency Standards (24 CCR Part 6)	California's Building Energy Efficiency Standards (Title 24, Part 6 of the CCR) serve to conserve electricity and natural gas in new building construction and are administered by CEC. Local governments enforce the standards through local building permitting and inspections. CEC updates these standards on a triennial basis. The 2016 Building Energy Efficiency Standards, which took effect on January 1, 2017, are approximately 28 percent more efficient than previous standards (2013) for residential land uses and 5 percent more efficient for nonresidential land uses. On May 9, 2018, CEC adopted the 2019 Building Energy Efficiency Standards which contain new requirements to further improve the energy efficiency of new buildings and will go into effect on January 1, 2020.
Comprehensive Energy Efficiency Plan for Existing Buildings (AB 758)	AB 758 (Skinner, Chapter 470, Statutes 2009) requires CEC, in collaboration with CPUC and stakeholders, to develop a comprehensive program to achieve greater energy efficiency in the state's existing buildings.
California Renewable Energy Portfolio Standard (RPS) (SB X1-2)	In 2011, Governor Brown signed SB X1-2, which requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 33 percent of their electricity supply (portfolio) from renewable sources by 2020. CPUC and CEC jointly implement the statewide RPS program through rulemakings and monitoring the activities of electric energy utilities in the state.
California Qualifying Facility and CHP Program Settlement	In December 2010, CPUC approved California's Qualifying Facility and CHP Program Settlement, which established a CHP framework for the state's investor-owned utilities. The settlement established a near-term target of 3,000 MW of CHP for entities under the jurisdiction of CPUC, although this target includes not just new CHP, but capacity from renewal of contracts due to expire in the next three years. CPUC has also adopted a settlement agreement that includes reforms to the Rule 21 interconnection process to provide a clear, predictable path to interconnection of distributed generation while maintaining the safety and reliability of the grid (CEC 2012).
California Strategy to Reduce Petroleum Dependence (AB 2076)	AB 2076 (Chapter 936, Statutes of 2000) requires CEC and CARB to develop and submit to the Legislature a strategy to reduce petroleum dependence in California. The statute requires the strategy to include goals for reducing the rate of growth in the demand for petroleum fuels. In addition, the strategy is required to include recommendations to increase transportation energy efficiency as well as the use of non-petroleum fuels and advanced transportation technologies including alternative fuel vehicles, hybrid vehicles, and high-fuel efficiency vehicles. The strategy, "Reducing California's Petroleum Dependence," was adopted by CEC and CARB in 2003. The strategy recommends that California reduce inroad gasoline and diesel fuel demand to 15 percent below 2003 demand levels by 2020 and maintain that level for the foreseeable future; the Governor and Legislature work to

Table A8: Applicable Laws and Regulations for Energy Resources	
Regulation	Description
	establish national fuel economy standards that double the fuel efficiency of new cars, light trucks, and sport utility vehicles; and increase the use of nonpetroleum fuels to 20 percent of on-road fuel consumption by 2020 and 30 percent by 2030.
Alternative and Renewable Fuel and Vehicle Technology Program (AB 118)	AB 118 (Statutes of 2007) created the CEC's Alternative and Renewable Fuel and Vehicle Technology Program. The statute, subsequently amended by AB 109 (Statutes of 2008), authorizes CEC to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the state's climate change policies.
Alternative Fuels Plan (AB 1007)	AB 1007 requires CEC to prepare a State plan to increase the use of alternative fuels in California. Any environmental document prepared for a strategic growth plan, regional blueprint general plan metropolitan planning or transportation plan should include an evaluation of alternative fuels for emissions or criteria pollutants, TACs, GHGs, water pollutants, and other harmful substances, and their impacts on petroleum consumption, and set goals for increased alternative fuel use in the State for the next decades, and recommend policies to ensure the alternative fuel goals are attained, including standards on transportation fuels and vehicle and policy mechanisms to ensure vehicles operating on alternative fuels use those fuels to the maximum extent feasible.
Bioenergy Action Plan (Executive Order (EO) S-06-06)	EO S-06-06 establishes targets for the use and production of biofuels and biopower and directs State agencies to work together to advance biomass programs in California while providing environmental protection and mitigation. The EO establishes the following target to increase the production and use of bioenergy, including ethanol and biodiesel fuels made from renewable resources: produce a minimum of 20 percent of its biofuels within California by 2010, 40 percent by 2020, and 75 percent by 2050. The EO also calls for the State to meet a target for use of biomass electricity.
Governor's Low Carbon Fuel Standard (LCFS) (EO S-01-07)	EO S-01-07 establishes a statewide goal to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020 through establishment of the LCFS. The EO requires LCFS to be incorporated into the State Alternative Fuels Plan required by AB 1007 and is one of the proposed discrete early action GHG reduction measures identified by CARB pursuant to AB 32. In January 2010, the Office of Administrative Law approved the LCFS regulation. CARB is currently amending the existing LCFS regulation.
The Sustainable Communities and Climate Protection Act of 2008 (SB 375)	SB 375 augments the existing federal requirement for metropolitan planning organizations (MPOs) to prepare regional transportation plans (RTPs) by requiring RTPs to include sustainable community strategies (SCSs). SCSs contain land use, transportation, and housing strategies to reduce vehicle miles traveled (VMT)-related GHG emissions from the automobile and light-duty truck sector. In 2010, CARB released the first round of GHG reduction targets for each of California's 18 MPOs. Strategies to reduce GHGs include incentive programs for the use of zero-emission vehicles (ZEVs) and plug-in hybrid electric vehicles (PHEVs) and the construction of ZEV and PHEV infrastructure. In March 2018, CARB released and adopted the second round of GHG reduction targets for the state's 18 MPOs.
Clean Energy and Pollution Reduction Act of 2015 (SB 350)	The Clean Energy and Pollution Reduction Act of 2015 (SB 350) requires the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources to be increased to 50 percent by December 31, 2030. This act also requires doubling of the energy efficiency savings in electricity and

Table A8: Applicable Laws and Regulations for Energy Resources	
Regulation	Description
	natural gas for retail customers through energy efficiency and conservation by December 31, 2030.
Local	
City/County General Plans	Many cities and counties have general plan elements and policies that specifically address energy use and conservation. Those energy conservation measures outlined in the various county and city general plans contain goals, objectives, and policies aimed at reducing energy consumption. Proponents of specific projects would be required to consult the applicable general plans and design the projects consistent with the guidelines of those general plans in which the projects are located.

7. GEOLOGY AND SOILS

A. Existing Conditions

1. U.S.

The U.S. has a diverse, complex, and seismically active geology that includes a vast array of landforms. Soils are as diverse as America's geology, and are described and characterized individually and collectively with other soils, and their various compatible uses in soil surveys published by USDA. Soils are fundamental and largely non-renewable resources that are the basis for high-level sustained yields of agricultural commodities, forest products, and provide support to the wide variety of ecological communities throughout the state.

The geology of the U.S. is very complex and can be divided into roughly five physiographic provinces: the American cordillera, the Canadian shield, the stable platform, the coastal plain, and the Appalachian orogenic belt. In Alaska, the geology is typical of the cordillera, whereas in Hawaii the major islands consist of Neogene volcanic erupted over a hotspot.

2. California

The State's topography is highly varied and includes 1,340 miles of seacoast, as well as high mountains, inland flat valleys, and deserts. Elevations in California range from 282 feet below sea level in Death Valley to 14,494 feet at the peak of Mount Whitney. The mean elevation of California is approximately 2,900 feet. The climate of California is as highly varied as its topography. Depending on elevation, proximity to the coast, and altitude, climate types include temperate oceanic, highland, sub-arctic, Mediterranean, steppe, and desert (U.S. Geological Survey (USGS), 1995). Precipitation in California is highly variable year-to-year and across the state. The southeast deserts typically receive less than 5 inches a year and the north coast can often receive up to 100 inches per year, averaging about 50 inches across the state. Approximately 75 percent of the state's annual precipitation falls between October and April, primarily in the form of rain, except for high mountain elevations (Department of Water Resources (DWR) 2014). Overall, northern California is wetter than southern California with most of the State's annual precipitation occurring in the northern coastal region.

a) Geology

Plate tectonics and climate have played major roles in forming California's dramatic landscape. California is located on the active western boundary of the North American continental plate in contact with the oceanic Pacific Plate and the Gorda Plate north of the Mendocino Triple Junction. The dynamic interactions between these three plates and California's climate are responsible for the unique topographic characteristics of California, including rugged mountain ranges, long and wide flat valleys, and dramatic coastlines (Harden 1997). Tectonics and climate also have a large effect on the occurrence natural environmental hazards, such as earthquakes, landslides, and volcanic formations.

b) Landslides

Landsliding or mass wasting is a common erosional process in California and has played an integral part in shaping the State's landscape. Typically, landslides occur in mountainous regions of the state, but they can also occur in areas of low relief, including coastal bluffs, along river and stream banks, and inland desert areas. Landsliding is the gravity-driven downhill mass movement of soil, rock, or both and can vary considerably in size, style and rate of movement, and type depending on the climate of a region, the steepness of slopes, rock type and soil depth, and moisture regime (Harden 1997).

c) Earthquakes

Earthquakes are a common and unpredictable occurrence in California. The tectonic development of California began millions of years ago by a shift in plate tectonics that converted the passive margin of the North American plate into an active margin of compressional and translational tectonic regimes. This shift in plate tectonics continues to make California one of the most geomorphically diverse, active, and picturesque locations in the U.S. While some areas of California are more prone to earthquakes, such as northern, central, and southern coastal areas of California, all areas of California are prone to the effects of ground shaking due to earthquakes. While scientists have made substantial progress in mapping earthquake faults where earthquakes are likely to occur and predicting the potential magnitude of an earthquake in any particular region, they have been unable to precisely predict where or when an earthquake will occur and what its magnitude will be.

d) Tsunamis

Coastal communities around the circum-Pacific have long been prone to the destructive effects of tsunamis. Tsunamis are a series of long-period, high-magnitude ocean waves that are created when an outside force displaces large volumes of water. Throughout time, major subduction zone earthquakes in both the Northern and Southern Hemispheres have moved the Earth's crust at the ocean bottom sending vast amounts of waters into motion and spreading tsunami waves throughout the Pacific Ocean.

Tsunamis can also occur from subareal and submarine landslides that displace large volumes of water. Subareal landslide-generated tsunamis can be caused by seismically generated landslides, rock falls, rock avalanches, and eruption or collapse of island or coastal volcanoes. Submarine landslide-generated tsunamis are typically caused by major earthquakes or coastal volcanic activity. In contrast to a seismically generated tsunami, seismic seiches are standing

waves that are caused by seismic waves traveling through a closed (lake) or semi-enclosed (bay) body of water. Due to the long-period seismic waves that originate after an earthquake, seiches can be observed several thousand miles away from the origin of the earthquakes. Small bodies of water, including lakes and ponds, are especially vulnerable to seismic seiches.

e) Volcanoes

A volcano is an opening in the Earth's crust through which magma escapes to the surface where it is extruded as lava. Volcanism may be spectacular, involving great fountains of molten rock, or tremendous explosions that are caused by the build-up of gases within the volcano (Ritchie and Gates 2001). Some of the most active volcanic areas in California are located within the Cascade Range - a volcanic chain that is a result of compressional tectonics along the Cascadia subduction zone.

f) Active Faults

A fault is defined as a fracture or zone of closely associated fractures along rocks that on one side have been displaced with respect to those on the other side. Most faults are the result of repeated displacement that may have taken place suddenly or by slow creep. A fault is distinguished from fractures or shears caused by landsliding or other gravity-induced surficial failures. A fault zone is a zone of related faults that commonly are braided and subparallel but may be branching and divergent. A fault zone has significant width (with respect to the scale of the fault being considered, portrayed, or investigated), ranging from a few feet to several miles (Bryant and Hart 2007).

In the State of California earthquake faults have been designated as being active through a process that has been described by the 1972 Alquist-Priolo Earthquake Fault Zoning Act. An active fault is defined by the State as one that has "had surface displacement within Holocene time (about the last 11,000 years)." This definition does not, of course, mean that faults lacking evidence for surface displacement within Holocene time are necessarily inactive. A fault may be presumed to be inactive based on satisfactory geologic evidence; however, the evidence necessary to prove inactivity sometimes is difficult to obtain and locally may not exist.

B. Regulatory Setting

Applicable laws and regulations associated with geology and soils are discussed in Table A9.

Table A9: Applicable Laws and Regulations for Geology and Soils	
Regulation	Description
Federal	
Safe Drinking Water Act (SDWA) - Federal Underground Injection Control (UIC) Class VI Program for Carbon Dioxide Geology Sequestration Wells	Under the SDWA, the UIC Class VI Program for Carbon Dioxide Geologic Sequestration Wells requires states and owners or operators to submit all permit applications to the appropriate U.S. EPA Region for a Class VI permit to be issued. These requirements, also known as the Class VI rule, are designed to protect underground sources of drinking water. The Class VI rule builds on existing UIC Program requirements, with extensive tailored requirements that address carbon dioxide (CO ₂) injection for long-term storage to ensure that wells used for geologic sequestration are appropriately sited, constructed, tested, monitored, funded, and closed. The rule also affords

Table A9: Applicable Laws and Regulations for Geology and Soils	
Regulation	Description
	owners or operators injection depth flexibility to address injection in various geologic settings in the U.S. in which geologic sequestration may occur, including very deep formations and oil and gas fields that are transitioned for use as CO ₂ storage sites.
SDWA - Federal UIC Class II Program for Oil and Gas Related Injection Wells	The Class II Program for Oil and Gas Related Injection Wells requires states to meet U.S. EPA's minimum requirements for UIC programs including strict construction and conversion standards and regular testing and inspection. Enhanced oil and gas recovery wells may either be issued permits or be authorized by rule. Disposal wells are issued permits.
CWA (40 CFR 112)	The CWA was enacted to restore and maintain the chemical, physical, and biological integrity of the nation's waters by regulating point and nonpoint pollution sources, helping publicly owned treatment works for the improvement of wastewater treatment, and maintaining the integrity of wetlands. This includes the creation of a system that requires states to establish discharge standards specific to water bodies (National Pollution Discharge Elimination System (NPDES)), which regulates storm water discharge from construction sites through the implementation of Storm Water Pollution Prevention Plans (SWPPPs). In California, the state's NPDES permit program is implemented and administered by the local RWQCBs.
Earthquake Hazards Reduction Act and National Earthquake Hazards Reduction Program Act	This Act established the National Earthquake Hazards Reduction Program to reduce the risks to life and property from future earthquakes. This program was significantly amended in November 1990 by the National Earthquake Hazards Reduction Program Act by refining the description of agency responsibilities, program goals and objectives.
Mining and Mineral Policy Act	The Mining and Mineral Act of 1970 declared that the Federal Government policy is to encourage private enterprise in the development of a sound and stable domestic mineral industry, domestic mineral deposits, minerals research, and methods for reclamation in the minerals industry.
State	
Seismic Hazards Mapping Act (PRC Section 2690 et seq.)	The Seismic Hazards Mapping Act of 1990 (PRC, Chapter 7.8, Division 2) directs the DOC Division of Mines and Geology (now called California Geological Survey (CGS)) to delineate Seismic Hazard Zones. The purpose of the Act is to reduce the threat to public health and safety and to minimize the loss of life and property by identifying and mitigating seismic hazards. These include areas identified that are subject to the effects of strong ground shaking, such as liquefaction, landslides, tsunamis, and seiches. Cities, counties, and state agencies are directed to use seismic hazard zone maps developed by CGS in their land-use planning and permitting processes. The Act requires that site-specific geotechnical investigations be performed prior to permitting most urban development projects within seismic hazard zones.
Alquist-Priolo Earthquake Fault Zoning Act (PRC Section 2621 et seq.)	California's Alquist-Priolo Act (PRC Section 2621 et seq.), originally enacted in 1972 as the Alquist-Priolo Special Studies Zones Act and renamed in 1994, is intended to reduce the risk 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 across the traces of active faults and strictly regulates construction in the corridors along active faults (Earthquake Fault Zones). It 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 the purposes of

Table A9: Applicable Laws and Regulations for Geology and Soils	
Regulation	Description
	the act as within the last 11,000 years). A fault is considered well-defined if its trace can be clearly identified by a trained geologist at the ground surface or in the shallow subsurface, using standard professional techniques, criteria, and judgment.
California Division of Oil, Gas, and Geothermal Resources (DOGGR) (PRC Section 3106).	PRC Section 3106 mandates the supervision of drilling, operation, maintenance, and abandonment of oil wells for preventing: damage to life, health, property, and natural resources; damage to underground and surface waters suitable for irrigation or domestic use; loss of oil, gas, or reservoir energy; and damage to oil and gas deposits by infiltrating water and other causes. In addition, the DOGGR regulates drilling, production, injection, and gas storage operations in accordance with 14 CCR Chapter 4, Subchapter 1 (commencing with Section 1710 et seq.).
Landslide Hazard Identification Program (PRC Section 2687(a))	The Landslide Hazard Identification Program requires the State Geologist to prepare maps of landslide hazards within urbanizing areas. According to PRC Section 2687(a), public agencies are encouraged to use these maps for land use planning and for decisions regarding building, grading, and development permits.
California Building Standards Code (CBSC) (24 CCR)	California's minimum standards for structural design and construction are given in the CBSC (24 CCR). The CBSC is based on the Uniform Building Code (International Code Council 1997), which is used widely throughout U.S. (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 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, proponents of specific projects would be required to comply with all provisions of the CBSC for certain aspects of design and construction.
Surface Mining and Reclamation Act (SMARA) (PRC Section 2710 et seq.)	The intent of the SMARA of 1975 was to promote production and conservation of mineral resources, minimize environmental effects of mining, and to assure that mined lands will be reclaimed to conditions suitable for alternative uses. An important part of the SMARA legislation requires the State Geologist to classify land according to the presence or absence of significant mineral deposits. Local jurisdictions are given the authority to permit or restrict mining operations, adhering to the SMARA legislation. Classification of an area using Mineral Resource Zones (MRZs) to designate lands that contain mineral deposits are designed to protect mineral deposits from encroaching urbanization and land uses that are incompatible with mining. The MRZ classifications reflect varying degrees of mineral significance, determined by available knowledge of the presence or absence of mineral deposits as well as the economic potential of the deposits.
Local	
Geotechnical Investigation	Local jurisdictions typically regulate construction activities through a process that may require the preparation of a site-specific geotechnical investigation. The purpose of a site-specific geotechnical investigation is to provide a geologic basis for the development of appropriate construction design. Geotechnical investigations typically assess bedrock and Quaternary geology, geologic structure, soils, and the previous history of excavation and fill placement. Proponents of specific projects that require design of earthworks and foundations for proposed structures will need to prepare geotechnical investigations on the physical properties of soil and rock at the site prior to project design.
Local Grading and Erosion Control Ordinances	Many counties and cities have grading and erosion control ordinances. These ordinances are intended to control erosion and sedimentation caused by construction activities. A grading permit is typically required for construction-related projects. As

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Regulation	Description
	part of the permit, project applicants usually must submit a grading and erosion control plan, vicinity and site maps, and other supplemental information. Standard conditions in the grading permit include a description of best management practices similar to those contained in a SWPPP.
City/County General Plans	Most city and county general plans include an element that covers geology and soil resources within that jurisdiction.

8. GREENHOUSE GASES

A. Existing Conditions

1. U.S. and California

a) Existing Climate

Climate is the accumulation of daily and seasonal weather events over a long period of time, whereas weather is defined as the condition of the atmosphere at any particular time and place (Ahrens 2003). Like its topography, California's climate is varied and tends toward extremes. Generally, there are two seasons in California: 1) a long, dry summer, with low humidity and cool evenings, and 2) a mild, rainy winter, except in the high mountains, where four seasons prevail, and snow lasts from November to April. The one climatic constant for the state is summer drought.

California has four main climatic regions. Mild summers and winters prevail in central coastal areas, where temperatures are more equable than virtually anywhere else in the U.S. For example, differences between average summer and winter temperatures between San Francisco and Monterey for example are seldom more than 10 degrees Fahrenheit (°F) (6 degrees Celsius (6°C)). During the summer, there are heavy fogs in San Francisco and all along the coast. Mountainous regions are characterized by milder summers and colder winters, with markedly low temperatures at high elevations. The Central Valley has hot summers and cool winters, while the Imperial Valley and eastern deserts are marked by very hot, dry summers, with temperatures frequently exceeding 100°F (38°C).

Average annual temperatures for the state range from 47°F (8°C) in the Sierra Nevada to 73°F (23°C) in the Imperial Valley. The highest temperature ever recorded in the U.S. was 134°F (57°C), registered in Death Valley on July 10, 1913. Death Valley has the hottest average summer temperature in the Western Hemisphere, at 98°F (37°C). The state's lowest temperature was -45°F (-43°C), recorded on January 20, 1937 at Boca, near the Nevada border.

Among the major population centers, Los Angeles has an average annual temperature of 63°F (17°C), with an average January minimum of 48°F (9°C) and an average July maximum of 75°F (24°C). San Francisco has an annual average of 57°F (14°C), with a January average minimum of 42°F (6°C) and a July average maximum of 72°F (22°C). The annual average in

San Diego is 64°F (18°C), with an average January minimum of 49°F (9°C), and an average July maximum 76°F (24°C). Sacramento's annual average temperature is 61°F (16°C), with January minimums averaging 38°F (3°C) and July maximums averaging 93°F (34°C).

Annual precipitation varies from only 2 inches (5 centimeters (cm)) in the Imperial Valley to 68 inches (173 cm) at Blue Canyon, near Lake Tahoe. San Francisco had an average annual precipitation (1971–2000) of 20 inches (51 cm), Sacramento 17.9 inches (45.5 cm), Los Angeles 13.2 inches (33.5 cm), and San Diego 10.8 inches (27.4 cm). The largest one-month snowfall ever recorded in the U.S., 390 inches (991 cm), fell in Alpine County in January 1911. Snow averages between 300 and 400 inches (760 to 1,020 cm) annually in the high elevations of the Sierra Nevada, but is rare in the Central Valley and coastal lowlands.

Sacramento has the greatest percentage (73 percent) of possible annual sunshine among the state's largest cities; Los Angeles has 72 percent and San Francisco 71 percent. San Francisco is the windiest, with an average annual wind speed of 11 miles per hour (mph) (18 kilometers per hour (km/hr)). Tropical rainstorms occur often in California during the winter.

b) Attributing Climate Change—The Physical Scientific Basis

Climate change is a long-term shift in the climate of a specific location, region, or planet. The shift is measured by changes in features associated with average weather, such as temperature, wind patterns, and precipitation. According to the Intergovernmental Panel on Climate Change (IPCC), the scientific body established by the World Meteorological Organization and by the United Nations Environment Programme, available scientific evidence supports the conclusion that most of the increased average global temperatures since the mid-20th century is very likely due to human-induced increases in GHG concentrations. GHGs, which are emitted from both natural and anthropogenic sources, include water vapor, CO₂, methane, nitrous oxide (N₂O), halocarbons, and ozone. These gases play a role in the "greenhouse effect" that helps regulate the temperature of the earth.

The current post-industrial warming trend differs alarmingly from past changes in the Earth's climate due to higher concentrations of GHGs in the Earth's atmosphere. As a result, global climate warming is occurring faster than at any other time on record within the past 650,000 years. Long-term, decadal, and inter-annual fluctuations in the Earth's climate have historically resulted from natural processes such as plate tectonics, the Earth's rotational orbit in space, solar radiation variability, and volcanism. The current trend derives from an added factor: human activities, which have greatly intensified the natural greenhouse effect, causing global warming. Anthropogenic activities that result in emissions of GHGs include the burning of fossil fuels such as coal, oil, and natural gas, cutting down trees (i.e., deforestation), and land-use changes. The burning of fossil fuels emits GHGs into the atmosphere, while deforestation and land-use changes remove trees and other kinds of vegetation that sequester CO₂. Emissions of GHGs associated with human activities have increased globally since pre-industrial times, with an increase of 70 percent between 1970 and 2004 (IPCC 2007).

A growing recognition of the wide-ranging impacts of climate change has fueled efforts over the past several years to reduce GHG emissions. In 1997, the Kyoto Protocol set legally binding emissions targets for industrialized countries and created innovative mechanisms to

assist these countries in meeting these targets. The Kyoto Protocol took effect in 2004, after 55 parties to the Convention had ratified it (The UN Climate Change Convention and the Kyoto Protocol). Six major GHGs have been the focus of efforts to reduce emissions and are included in the California Global Warming Solutions Act (AB 32): CO₂, methane, N₂O, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). They are regulated under the Kyoto Protocol. Nitrogen trifluoride was later added to the list of important GHGs to reduce and codified in California statute.

The “global warming potential” (GWP) metric is used to convert all GHGs into “CO₂-equivalent” (CO₂e) units. Importantly, metrics such as GWP have been used as an exchange rate in multi-gas emissions policies and frameworks. Each gas’s GWP is defined relative to CO₂. For example, using values from the IPCC’s Fourth Assessment Report, N₂O’s GWP is 298, meaning a unit mass of N₂O warms the atmosphere 298 times more than a unit mass of CO₂. SF₆ and PFCs have extremely long atmospheric lifetimes, resulting in their essentially irreversible accumulation in the atmosphere once emitted. However, in terms of quantity of emissions, CO₂ dominates world and U.S. GHG emissions.

Because the major GHGs have longer lives, they build up in the atmosphere so that past, present, and future emissions ultimately contribute to total atmospheric concentrations. Thus, while reducing emissions of conventional air pollutants decreases their concentrations in the atmosphere in a relatively short time, atmospheric concentrations of the major GHGs can only be gradually reduced over years and decades. More specifically, the rate of emission of CO₂ currently greatly exceeds its rate of removal, and the slow and incomplete removal implies that small to moderate reductions in its emissions would not result in stabilization of CO₂ concentrations, but rather would only reduce the rate of its growth in coming decades. Many of the same activities that emit conventional air pollutants also emit GHGs (e.g., the burning of fossil fuels to produce electricity, heat or drive engines and the burning of biomass). Some conventional air pollutants also have greenhouse effects; for example, soot/black carbon and tropospheric ozone (see Short-Lived Climate Pollutants below).

c) Attributing Climate Change—Greenhouse Gas Emission Sources

Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the transportation, industrial/manufacturing, utility, residential, commercial, and agricultural sectors. In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation. Anthropogenic emissions of CO₂ are byproducts of fossil fuel combustion. Methane, a potent GHG, resulting primarily from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions), is largely associated with fugitive emissions from oil and gas operations, natural gas transmission, agricultural practices, and landfills. N₂O is also largely attributable to agricultural practices (nitrogen-based fertilizers) and soil management. CO₂ sinks, or reservoirs, include vegetation, soils, and the ocean, which absorb CO₂ through sequestration and dissolution, respectively, two of the most common processes of CO₂ sequestration.

CO₂e is a measurement used to account for the fact that different GHGs have different potential to retain infrared radiation in the atmosphere and contribute to the greenhouse effect (i.e., GWP). The GWP is dependent on the lifetime, or persistence, of the gas molecule in the

atmosphere. For example, as described in Appendix C, “Calculation References,” of the General Reporting Protocol of the California Climate Action Registry (CCAR) 1 ton of methane has the same contribution to the greenhouse effect as approximately 34 tons of CO₂ (IPCC 2013; CCAR 2007). Therefore, methane is a much more potent GHG than CO₂. Expressing emissions in CO₂e takes the contributions of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO₂ were being emitted.

The California GHG inventory compiles statewide anthropogenic GHG emissions and sinks. It includes estimates for CO₂, methane, N₂O, SF₆, NF₃, HFCs, and PFCs. The current inventory covers years 2000 to 2015 (available at <https://www.arb.ca.gov/cc/inventory/data/data.htm>).

California’s gross emissions of GHGs decreased by 9 percent from 478.4 million metric tons of CO₂e (MMTCO₂e) in 2001 to 440.4 MMTCO₂e in 2015, with a maximum of 489.2 MMTCO₂e in 2004. During the same period, California’s population grew by 9 percent from 34.5 to 37.6 million people. As a result, California’s per capita GHG emissions have decreased over the last 11 years from 13.9 to 11.9 metric tons (MT) CO₂e per person. In 2015, emissions continued to decrease for the transportation, electric power, and commercial and residential sectors. Emissions from the other sectors (i.e., agriculture, high GWP, and recycling and waste) remained relatively flat or increased slightly from 2010 (CARB 2017a).

d) Short-Lived Climate Pollutants

Climate policy and research have mainly concentrated on long-term climate change and controlling the long-lived GHGs. However, there is growing recognition within the scientific community that efforts to address climate change should also focus on near-term actions to reduce climate-warming substances with much shorter atmospheric lifetimes. These non-CO₂ pollutants, known as short-lived climate pollutants (SLCP), include methane, fluorinated gases including HFCs, and black carbon.

From a global perspective, SLCPs represent nearly 40 percent of the total climate pollutant emissions. In California, their contribution is smaller at around 30 percent. SLCPs have relatively short lifetimes in the atmosphere, but have significant GWP, which represent the ability to trap heat relative to CO₂. Since SLCPs remain in the atmosphere for periods of only a few days to a few decades, reducing their emissions results in immediate benefits. Thus, controlling sources of SLCPs is a critical climate strategy for reducing the near-term rate of global warming, particularly in regions most vulnerable to climate change.

California has established a strong track record with significant SLCP reductions as a co-benefit to its long-standing programs to clean up the air and protect public health. These include diesel engine controls, advanced clean cars, restrictions on burning, development of a refrigerant management program, and landfill controls. In March 2017, CARB adopted the SLCP Reduction Strategy to further reduce SLCP emissions as a component of achieving statewide GHG reduction goals. The SLCP Reduction Strategy aims to reduce emissions of methane from the solid waste, agricultural, wastewater, and oil and gas sectors; reduce emissions of carbon dioxide through forest management practices; and reduce emissions of

fluorinated gases through more stringent protocols regarding the use and manufacturing of refrigerants (CARB 2017b).

i) Tropospheric Ozone

Ozone is a highly reactive and unstable gas. Stratospheric ozone, a layer of ozone high up in the atmosphere, is beneficial and absorbs ultraviolet radiation. Tropospheric (ground-level) ozone is a major air and climate pollutant. Tropospheric ozone is the main component of smog and causes serious health effects such as asthma and lung disease. Tropospheric ozone also affects sensitive vegetation and ecosystems, including forests, parks, wildlife refuges and wilderness areas. Tropospheric ozone can act as a direct GHG and as an indirect controller of GHG lifetimes. As a strong oxidant, it affects the lifetimes and concentrations of atmospheric trace gases, including methane and HFCs.

Tropospheric ozone is not emitted directly into the air. It is created by photochemical reactions between NO_x and VOC emissions from vehicles, industrial facilities, consumer products and many other sources.

Ozone has long been recognized as a significant local and regional air quality issue due to its impacts on human health and the environment. Federal clean air laws require areas with unhealthy levels of ozone to develop plans, known as State Implementation Plans (SIP). These plans include measures that describe how an area will attain federal ozone air quality standards. In addition to measures included in the SIP, the State has adopted several regulatory programs focused on controlling ozone forming compounds (NO_x and VOCs). These include the Low Emission Vehicle Programs, Off-Road Engine Standards, On-Road Heavy-Duty Diesel Vehicles Regulation, and Consumer Products Regulations.

ii) Methane

Methane is a potent and short-lived GHG. It is the second most prevalent GHG emitted in the U.S. from human activities. In addition to its climate forcing properties, methane also has several indirect effects including its role in contributing to global background ozone. As air quality standards tighten, reducing background ozone becomes more critical.

Enteric fermentation, manure management, landfills, natural gas transmission (methane is a significant constituent of natural gas), and wastewater treatment are the state's largest anthropogenic methane-producing sources.

Methane concentrations have been increasing due to human activities related to fossil fuel extraction and distribution, agriculture, and waste handling. Methane emissions are also contributed by non-anthropogenic or "natural" sources such as wetlands, oceans, forests, fires, terrestrial arthropods (such as termites) and geological sources (such as submarine gas seepage, micro seepage over dry lands and geothermal seeps).

iii) Hydrofluorocarbons

HFCs are synthetic gases that are the fastest growing climate forcers in the U.S. as well as in many other countries. HFCs represent just three percent of all GHG emissions in California, but their warming effect is hundreds to thousands of times that of CO₂. HFCs are primarily

produced for use as substitutes for ozone-depleting substances (ODS) in refrigeration, air conditioning, insulating foams, solvents, aerosol products, and fire protection.

vi) Black Carbon

Black carbon is a subset of PM emissions and consists of small dark particles that result from incomplete combustion of fossil fuels, bio-fuels, and biomass. It contributes to climate change both directly by absorbing sunlight, and indirectly by depositing on snow and by interacting with clouds and affecting cloud formation.

Unlike other GHGs, black carbon has a very short atmospheric lifetime (an average of about a week), resulting in a strong correlation to regional emission sources. As a result, emission reductions have immediate benefits for climate and health.

The main sources of black carbon in California are wildfires, off-road vehicles (e.g., locomotives, marine vessels, tractors, excavators, dozers), on-road vehicles (e.g., cars, trucks, and buses), fireplaces, agricultural burning (burning agricultural waste), and prescribed burning (planned burns of forest or wildlands). California has been an international leader in reducing black carbon, with 90 percent control since the early 1960s and close to 95 percent control expected by 2020 due to existing programs that target reducing PM from diesel engines and burning activities.

Recent CARB estimates suggest that the annual black carbon emissions in California decreased about 70 percent between 1990 and 2010, in direct proportion to declining diesel PM emissions – a co-benefit of CARB's regulations on diesel engines. Other categories of diesel engines, such as off-road diesels (e.g., agricultural and construction equipment), building equipment and diesel generators, are also projected to have major declines in diesel PM emissions. Efforts to manage agricultural, forest, and range land management burning operations are expected to continue reducing black carbon emissions.

e) Adaptation to Climate Change

According to IPCC global average temperature is expected to increase by 3–7°F by the end of the century, depending on future GHG emission scenarios (IPCC 2013). Resource areas other than air quality and global average temperature could be indirectly affected by the accumulation of GHG emissions. For example, an increase in the global average temperature is expected to result in a decreased volume of precipitation falling as snow in California and an overall reduction in snowpack in the Sierra Nevada. Snowpack in the Sierra Nevada provides both water supply (runoff) and storage (within the snowpack before melting), which is a major source of supply for the state.

According to CEC, statewide average temperatures increased by about 1.7 degrees Fahrenheit from 1895 to 2011 (CEC 2012). Throughout the past century precipitation (i.e., rain and snow) has followed the expected pattern of a largely Mediterranean climate with wet winters and dry summers, and considerable variability from year to year. No consistent trend in the overall amount of precipitation has been detected, except that a larger proportion of total precipitation is falling as rain instead of snow. In addition, during the last 35 years, the Sierra Nevada range has witnessed both the wettest and the driest years on record of more than 100

years. While intermittent droughts have been a common feature of the state's climate, evidence from tree rings and other indicators reveal that over the past 1,500 years, California has experienced dry spells that persisted for several years or even decades (CEC 2012).

The effects of global climate change could lead to a variety of secondary effects to public health, water supply, energy supply, sea level, wildfire risks, and ecosystems. Recent data, climate projections, topographic, demographic, and land use information have led to the findings that:

- The state's electricity system is more vulnerable than was previously understood.
- The Sacramento-San Joaquin Delta is sinking, putting levees at growing risk.
- Wind and waves, in addition to faster rising seas, will worsen coastal flooding.
- Animals and plants need connected "migration corridors" to allow them to move to more suitable habitats to avoid serious impacts.
- Native freshwater fish are particularly threatened by climate change.
- Minority and low-income communities face the greatest risks from climate change.
- There are effective ways to prepare for and manage climate change risks, but local governments face many barriers to adapting to climate change; these can be addressed so that California can continue to prosper.

At the same time, the State has recognized the need to adapt to climate change impacts that can no longer be avoided. In 2014, the CA Natural Resources Agency released the Safeguarding California Plan, which serves as an update to the 2009 California Climate Adaptation Strategy. The many adaptation planning efforts underway in virtually every State agency, in regional and local communities such as Chula Vista, San Diego, Los Angeles, Santa Barbara, Santa Cruz, San Francisco, Hayward, Marin County, Sacramento, and others, as well as in private businesses suggest that CEOs, elected officials, planners, and resource managers understand the reality that California and the world is facing.

In fact, the latest climate science makes clear that State, national, and global efforts to mitigate climate change must be accelerated to limit global warming to levels that do not endanger basic life-support systems and human well-being. Success in mitigation will keep climate change within the bounds that allow ecosystems and society to adapt without major disruptions. Further advances in integrated climate change science can inform California's and the world's climate choices and help ensure a resilient future (CEC 2012).

B. Regulatory Setting

Applicable laws and regulations specific to the reduction of GHG emissions are listed in Table A10 below. It should be noted that other laws and regulations described under Energy Demand in this Environmental Setting would also reduce GHG emissions.

Table A10: Applicable Laws and Regulations for Greenhouse Gases	
Regulation	Description
Federal	
Mandatory Greenhouse Gas Reporting Rule	On September 22, 2009, U.S. EPA issued a final rule for mandatory reporting of GHGs from large GHG emissions sources in the U.S. In general, this national reporting requirement will provide U.S. EPA with accurate and timely GHG emissions data from facilities that emit 25,000 MTCO ₂ e per year. This publicly available data will allow the reporters to track their own emissions, compare them to similar facilities, and aid in identifying cost effective opportunities to reduce emissions in the future. Reporting is at the facility level, except that certain suppliers of fossil fuels and industrial greenhouse gases along with vehicle and engine manufacturers will report at the corporate level. An estimated 85 percent of the total U.S. GHG emissions, from approximately 10,000 facilities, are covered by this final rule.
National Program to Cut Greenhouse Gas Emissions and Improve Fuel Economy for Cars and Trucks	<p>On September 15, 2009, U.S. EPA and NHTSA proposed a new national program that would reduce GHG emissions and improve fuel efficiency for all new cars and trucks sold in the U.S. EPA proposed the first-ever national GHG emissions standards under the CAA, and NHTSA proposed CAFE standards under the Energy Policy and Conservation Act (EPCA). This proposed national program would allow automobile manufacturers to build a single light-duty national fleet that satisfies all requirements under both Federal programs and the standards of California and other states. The President requested that U.S. EPA and NHTSA, on behalf of DOT, develop, through notice and comment rulemaking, a coordinated National Program under the CAA and the EPCA, as amended by the Energy Independence and Security Act (EISA), to reduce fuel consumption by and GHG emissions of light-duty vehicles for model years 2017–2025.</p> <p>U.S. EPA and NHTSA are developing the proposal based on extensive technical analyses, an examination of the factors required under the respective statutes and on discussions with individual motor vehicle manufacturers and other stakeholders. The National Program would apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles (light-duty vehicles) built in those model years (76 FR 48758).</p> <p>The first part of this program (i.e., 2012–2016) is implemented. The next part (i.e., 2017–2025) was released by U.S. EPA in 2016 for which CARB is proposed to accept compliance thereof as also being acceptable for California compliance, similar to what was done for the first part.</p>
Endangerment and Cause or Contribute Findings	On December 7, 2009, U.S. EPA adopted its Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases under the CAA (Endangerment Finding). The Endangerment Finding is based on Section 202(a) of the CAA, which states that the Administrator (of U.S. EPA) should regulate and develop standards for “emission(s) of air pollution from any class or classes of new motor vehicles or new motor vehicle engines, which in (its) judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare.” The rule addresses Section 202(a) in two distinct findings. The first addresses whether the concentrations of the six key GHGs (i.e., CO ₂ , methane, N ₂ O, HFCs, PFCs, and SF ₆) in the atmosphere threaten the public health and welfare of current and future generations. The second addresses whether or not the combined emissions of GHGs

Table A10: Applicable Laws and Regulations for Greenhouse Gases	
Regulation	Description
	<p>from new motor vehicles and motor vehicle engines contribute to atmospheric concentrations of GHGs and therefore the threat of climate change.</p> <p>The Administrator found that atmospheric concentrations of GHGs endanger the public health and welfare within the meaning of Section 202(a) of the CAA. The evidence supporting this finding consists of human activity resulting in “high atmospheric levels” of GHG emissions, which are very likely responsible for increases in average temperatures and other climatic changes. Furthermore, the observed and projected results of climate change (e.g., higher likelihood of heat waves, wild fires, droughts, sea level rise, and higher intensity storms) are a threat to the public health and welfare. Therefore, GHGs were found to endanger the public health and welfare of current and future generations.</p> <p>The Administrator also found that GHG emissions from new motor vehicles and motor vehicle engines are contributing to air pollution, which is endangering public health and welfare. U.S. EPA’s final findings respond to the 2007 U.S. Supreme Court decision that GHGs fit within the CAA definition of air pollutants. The findings do not in and of themselves impose any emission reduction requirements but rather allow U.S. EPA to finalize the GHG standards proposed earlier in 2009 for new light-duty vehicles as part of the joint rulemaking with DOT.</p>
Significant New Alternatives Policy (SNAP)	<p>U.S. EPA’s SNAP program provides an evolving list of alternatives (i.e., chemicals that may replace one that is currently in use for a specific purpose). U.S. EPA makes decisions informed by the overall understanding of the environmental and human health impacts as well as the current knowledge regarding available substitutes. Where U.S. EPA is determining whether to add a new substitute to the list, U.S. EPA compares the risk posed by the new substitute to the risks posed by other alternatives on the list and determines whether that specific new substitutes poses more risk than already-listed alternatives for the same use. Section 612 of the CAA provides that U.S. EPA must prohibit the use of a substitute where it has determined that there are other available substitutes that pose less overall risk to human health and the environment.</p>
State	
EO S-3-05	<p>EO S-3-05, which was signed by former Governor Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra’s snowpack, further exacerbate California’s air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order established statewide GHG emission reduction targets. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.</p> <p>The EO directed the Secretary of the California Environmental Protection Agency (CalEPA) to coordinate a multi-agency effort to reduce GHG emissions to the target levels. The Secretary will also submit biannual reports to the governor and State legislature describing: progress made toward reaching the emission targets; impacts of global warming on California’s resources; and mitigation and adaptation plans to combat these impacts. To comply with the EO, the Secretary of the CalEPA created the Climate Action Team (CAT) made up of members from various State agencies and</p>

Table A10: Applicable Laws and Regulations for Greenhouse Gases	
Regulation	Description
	commission. CAT released its first report in March 2006. The report proposed to achieve the targets by building on voluntary actions of California businesses, local government and community actions, as well as through State incentive and regulatory programs.
AB 32, the California Global Warming Solutions Act, Statutes of 2006	<p>In September 2006, former Governor Arnold Schwarzenegger signed AB 32, the California Global Warming Solutions Act of 2006. AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. This reduction will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs CARB to develop and implement regulations to reduce statewide GHG emissions from substantial stationary and mobile source categories. AB 32 requires CARB to produce a Scoping Plan by 1/1/2009 and at least every 5 years afterwards that details how the State will meet its GHG reduction targets.</p> <p>AB 32 requires that CARB adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the State achieves the reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.</p>
EO B-30-15	EO B-30-15 (2015) established a California GHG reduction target of 40 percent below 1990 levels by 2030. To accomplish this goal, directs State agencies to take measures consistent with their existing authority to reduce GHG emissions. CARB initiated a public process in the summer of 2015 and worked closely with other State agencies to update the State's Climate Change Scoping Plan. The 2017 Scoping Plan, released and adopted in December 2017, provides the framework for achieving the 2030 target. Concurrent planning efforts related to energy efficiency in existing buildings (AB 758), SLCPs, sustainable freight, Greenhouse Gas Reduction Fund Investments, forest health, and others will be coordinated with, and feed into, the 2017 Scoping Plan.
SB 32 and AB 197 (Statutes of 2016)	Governor Brown signed SB 32 (Pavley, Chapter 249, Statutes of 2016) and AB 197 (Garcia, Chapter 250, Statutes of 2016) on September 8, 2016. SB 32 establishes a statewide target of reducing statewide GHG emissions to 40 percent below 1990 levels by 2030. This is the same target contained in EO B-30-15 (2015). SB 32 authorizes CARB to adopt regulations to achieve the maximum technologically-feasible and cost-effective GHG reductions. AB 197 creates a legislative committee to oversee CARB and requires CARB to take specific actions when adopting plans and regulations pursuant to SB 32 related to disadvantaged communities, identification of specific information regarding reduction measures, and information regarding existing greenhouse gases at the local level.
SB 350, Clean Energy and Pollution Reduction Act of 2015 (Statutes of 2015)	The Clean Energy and Pollution Reduction Act of 2015 (De León, Chapter 547, Statutes of 2015) requires the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources be increased to 50percent by December 31, 2030. This act also requires doubling of the energy efficiency savings in

Table A10: Applicable Laws and Regulations for Greenhouse Gases

Regulation	Description
	electricity and natural gas for retail customers, through energy efficiency and conservation, by December 31, 2030.
SB 605, SLCs (Statutes of 2014)	<p>SB 605 (Lara, Chapter 605, Statutes of 2014) directs CARB to complete a comprehensive strategy to reduce emissions of short-lived climate pollutants in the State through the following actions:</p> <ol style="list-style-type: none"> (1) Complete an inventory of sources and emissions of short-lived climate pollutants in the State based on available data. (2) Identify research needs to address any data gaps. (3) Identify existing and potential new control measures to reduce emissions. (4) Prioritize the development of new measures for short-lived climate pollutants that offer co-benefits by improving water quality or reducing other air pollutants that impact community health and benefit disadvantaged communities, as identified pursuant to Section 39711 of the Health and Safety Code. (5) Coordinate with other State agencies and districts to develop measures identified as part of the comprehensive strategy. <p>In 2017, CARB published and adopted the SLCP Reduction Strategy, which serves as one of five pillars identified by Governor Jerry Brown to achieve the state's GHG reduction goals for 2030 and 2050.</p>
AB 1493, Statutes of 2002	In September 2004, CARB approved regulations to reduce GHG emissions from new motor vehicles. CARB took this action pursuant to Chapter 200, Statutes of 2002 (AB 1493, Pavley) which directed CARB to adopt regulations that achieve the maximum feasible and cost-effective reduction in GHG emissions from motor vehicles. The regulations, which took effect in 2006 following an opportunity for legislative review, apply to new passenger vehicles and light-duty trucks beginning with the 2009 model year.
EO S-1-07	EO S-1-07, which was signed by former Governor Schwarzenegger in 2007, proclaims that the transportation sector is the main source of GHG emissions in California, at over 40 percent of statewide emissions. It establishes a goal that the carbon intensity of transportation fuels sold in California should be reduced by a minimum of 10 percent by 2020. This order also directed CARB to determine if the LCFS could be adopted as a discrete early action measure after meeting the mandates in AB 32. CARB adopted the original LCFS regulation on April 23, 2009.
SB 1368, Statutes of 2006	SB 1368 is the companion bill of AB 32 and was signed by former Governor Schwarzenegger in September 2006. SB 1368 requires CPUC to establish a GHG emission performance standard for baseload generation from investor owned utilities by February 1, 2007. CEC must establish a similar standard for local publicly owned utilities by June 30, 2007. These standards cannot exceed the GHG emission rate from a baseload combined-cycle natural gas fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by CPUC and CEC.

Table A10: Applicable Laws and Regulations for Greenhouse Gases	
Regulation	Description
SB 1078, Statutes of 2002, SB 107, Statutes of 2006, and SBx1 2	SB 1078 (Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010. In 2010, SBx1 2 was chaptered, which expanded the state's RPS to 33 percent renewable power by 2020.
SB 97, Statutes of 2007	As directed by SB 97, the California Natural Resources Agency (CNRA) adopted Amendments to the CEQA Guidelines for GHG emissions on December 30, 2009. On February 16, 2010, the Office of Administrative Law approved the Amendments, and filed them with the Secretary of State for inclusion in the California Code of Regulations. The Amendments became effective on March 18, 2010.
SB 375, Statutes of 2008	<p>SB 375, signed in September 2008, aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. SB 375 requires MPOs to adopt an SCS or Alternative Planning Strategy (APS), which will prescribe land use allocation in that MPO's RTP. CARB, in consultation with MPOs, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light-duty trucks in the region for the years 2020 and 2035. These reduction targets will be updated every eight years but can be updated every four years if advancements in emissions technologies affect the reduction strategies to achieve the targets. CARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, transportation projects would not be eligible for funding programmed after January 1, 2012.</p> <p>This bill also extends the minimum time period for the Regional Housing Needs Allocation cycle from five years to eight years for local governments located within an MPO that meets certain requirements. City or county land use policies (including general plans) are not required to be consistent with the RTP (and associated SCS or APS). However, new provisions of CEQA would incent qualified projects that are consistent with an approved SCS or APS, categorized as "transit priority projects."</p>

Table A10: Applicable Laws and Regulations for Greenhouse Gases	
Regulation	Description
EO S-13-08	<p>Sea-level rise is a foreseeable indirect environmental impact associated with climate change, largely attributable to thermal expansion of the oceans and melting polar ice. As discussed above in the environmental setting (subheading “Adaptation to Climate Change”), sea level rise presents impacts to California associated with coastal erosion, water supply, water quality, saline-sensitive species and habitat, land use compatibility, and flooding. Former Governor Arnold Schwarzenegger signed EO S-13-08 on November 14, 2008. This EO directed the CNRA to develop the 2009 California Climate Adaptation Strategy, which summarizes the best-known science on climate change impacts in seven distinct sectors—public health, biodiversity and habitat, ocean and coastal resources, water management, agriculture, forest resources, and transportation and energy infrastructure—and provides recommendations on how to manage against those threats (CNRA 2009). This EO also directed the Office of Planning and Research (OPR), in cooperation with the CNRA, to provide land use planning guidance related to sea level rise and other climate change impacts by May 30, 2009, which is also provided in the 2009 California Climate Adaptation Strategy and OPR continues to further refine land use planning guidance related to climate change impacts (CNRA 2009).</p> <p>EO S-13-08 also directed CNRA to convene an independent panel to complete the first California Sea Level Rise Assessment Report. This report is to be completed no later than December 1, 2010. The report is intended to provide information on the following:</p> <ul style="list-style-type: none"> • Relative sea level rise projections specific to California, considering issues such as coastal erosion rates, tidal impacts, El Niño and La Niña events, storm surge, and land subsidence rates; • The range of uncertainty in selected sea level rise projections; • A synthesis of existing information on projected sea level rise impacts to State infrastructure (such as roads, public facilities, and beaches), natural areas, and coastal and marine ecosystems; and • Discussion of future research needs regarding sea level rise for California.
CARB’s Landfill Methane Control Measure	<p>The regulation requires owners and operators of certain uncontrolled municipal solid waste landfills to install gas collection and control systems and requires existing and newly installed gas and control systems to operate in an optimal manner. The regulation allows local air districts to voluntarily enter into agreements with CARB to implement and enforce the regulation and to assess fees to cover costs. Some local air districts have also adopted rules to implement federal standards for the installation of gas collection and control systems.</p>
AB 341 (Statutes of 2011)	<p>AB 341 (Chesbro, Chapter 476, Statutes of 2011) established a State target to reduce by 75 percent the amount of solid waste sent to landfills by 2020 through recycling, composting, and source reduction practices.</p>
AB 1826 (Statutes of 2014)	<p>AB 1826 (Chesbro, Chapter 727, Statutes of 2014) requires businesses generating specified amounts of organic wastes to begin arranging for the recycling and diversion of those wastes from landfill disposal beginning in 2016.</p>

Table A10: Applicable Laws and Regulations for Greenhouse Gases	
Regulation	Description
Refrigerant Management Plan	The Refrigerant Management Plan requires facilities with refrigeration systems with more than 50 pounds of high-GWP refrigerant to: conduct and report periodic leak inspections; promptly repair leaks; and keep service records on site.
Compliance Offset Protocols under the State's Cap-and-Trade Program	Compliance Offset Protocols under the state's Cap-and-Trade Program include a livestock protocol, rice cultivation protocol, and mine methane capture protocol. The protocols provide methods to quantify, report, and credit GHG emission reductions from sectors not covered by the Cap-and-Trade Program.
AB 1257 (Statutes of 2013)	AB 1257 (Bocanegra, Chapter 749, Statutes of 2013) directs CEC to assemble a report by November 2015 (and every four years after), in consultation with other State agencies, to identify strategies for maximizing the benefits obtained from natural gas as an energy source.
AB 1900 (Statutes of 2012)	AB 1900 (Gatto, Chapter 602, Statutes of 2012) directed CPUC to adopt natural gas constituent standards (in consultation with CARB and the Office of Environmental Health and Hazard Assessment (OEHHA)). The legislation is also designed to streamline and standardize customer pipeline access rules and encourage the development of statewide policies and programs to promote all sources of biomethane production and distribution.
SB 1122 (Statutes of 2012)	SB 1122 (Rubio, Chapter 612, Statutes 2012) directed CPUC to require the state's investor-owned utilities to develop and offer 10 to 20-year market-price contracts to procure an additional 250 megawatts of cumulative electricity generation from biogas facilities that commence operating on or after June of 2013.

9. HAZARDS AND HAZARDOUS MATERIALS

A. Existing Conditions

1. U.S.

Hazardous materials are substances with physical properties that could pose a substantial present or future hazard to human health or the environment when improperly handled, disposed, or otherwise managed. A number of properties may cause a substance to be considered hazardous, including toxicity (causes human health effects), ignitability (can burn), corrosivity (causes severe burns or damage to materials), and reactivity (causes explosions or generates toxic gases). The term "hazardous material" refers to both hazardous substances and hazardous wastes. A hazardous waste is a waste with a chemical composition or other properties that make it capable of causing illness, death, or some other harm to humans and other life forms when mismanaged or released into the environment. This includes items, such as fuels, industrial solvents and chemicals, process water, and spent materials (e.g., pozzolans, foams).

Naturally occurring hazardous materials in the U.S. include asbestos, radon, and mercury. Asbestos is a naturally occurring mineral composed of long, thin, fibrous crystals. Asbestos is found in 20 of the U.S. states and has been mined in 17 of these states, including the Appalachian region, California, and Oregon. Mercury is a chemical element that comes from both natural sources and human activities. Natural sources of mercury include volcanoes, hot springs, and natural mercury deposits. Sources related to human activities include coal combustion and certain industrial and mining activities. Radon is a gas that forms during the decay of uranium that is naturally found in rock, water, and soil. It migrates to the surface through cracks or fractures in the Earth's crust.

2. California

Health and Safety Code Section 25501 defines "hazardous materials," in part, as a material identified in statute that, "because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment." Hazardous materials include, but are not limited to, hazardous substances, hazardous waste, and any material which a handler or the administering regulatory agency has a reasonable basis for believing would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment. A number of properties may cause a substance to be considered hazardous, including toxicity (causes human health effects), ignitibility (can burn), corrosivity (causes severe burns or damage to materials), and reactivity (causes explosions or generates toxic gases). A hazardous waste is a waste with a chemical composition or other properties that make it capable of causing illness, death, or some other harm to humans and other life forms when mismanaged or released into the environment. This may include items, such as spent fuels, industrial solvents and chemicals, process water, and other spent materials (i.e., some types of batteries and fuel cells). California's hazardous waste regulations provide criteria to use to determine whether a waste is hazardous, including the following: 1) a list of criteria (toxic, ignitable, corrosive, and reactive) that a waste may exhibit; 2) a list of those wastes that are subject to regulation; and 3) a list of chemical names and common names that are presumed to be hazardous in California. The California Hazardous Waste Control Law recognizes more than 780 hazardous chemicals and nearly 30 additional common materials that may be hazardous.

Naturally occurring hazardous materials are also found in California, including asbestos. Naturally occurring asbestos is also often found in a type of rock (serpentine) located in the California Coast Ranges and Sierra foothills.

B. Regulatory Setting

Applicable laws and regulations associated with hazards and hazardous materials are discussed in Table A11.

Table A11: Applicable Laws and Regulations for Hazards and Hazardous Materials	
Regulations	Description
Federal	
CWA (40 CFR 112)	The 1972 amendments to the CWA provide the statutory basis for the NPDES permit program and the basic structure for regulating the discharge of pollutants from point sources to waters of the U.S. Section 402 of the CWA specifically required U.S. EPA to develop and implement the NPDES program.
SDWA	SDWA is the main federal law that ensures the quality of Americans' drinking water. Under the SDWA, U.S. EPA sets standards for drinking water quality and oversees the states, localities, and water suppliers who implement those standards. The SDWA was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources: rivers, lakes, reservoirs, springs, and ground water wells. The SDWA does not regulate private wells which serve fewer than 25 individuals.
Federal Hazardous Materials Regulations (Title 49, CFR, Parts 100-180)	The regulations establish criteria for the safe transport of hazardous materials. Compliance is mandatory for intrastate and interstate transportation.
Toxic Substances Control Act (TSCA) 15 USC Section 2601 et seq.	The TSCA provides U.S. EPA with authority to require reporting, record-keeping and testing requirements, and restrictions relating to chemical substances and/or mixtures. The TSCA addresses the production, importation, use, and disposal of specific chemicals including polychlorinated biphenyls, asbestos, radon, and lead-based paint.
Resource Conservation and Recovery Act (RCRA) (42 USC Section 6901 et seq. (40 CFR Parts 260-273)	The RCRA of 1976 gives U.S. EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. The RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to the RCRA enabled U.S. EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. The Federal Hazardous and Solid Waste Amendments are the 1984 amendments to the RCRA that focused on waste minimization and phasing out land disposal of hazardous waste as well as corrective action for releases. Some of the other mandates of this law include increased enforcement authority for U.S. EPA, more stringent hazardous waste management standards, and a comprehensive underground storage tank program. Federal regulations adopted by U.S. EPA are found in 40 CFR.

Table A11: Applicable Laws and Regulations for Hazards and Hazardous Materials	
Regulations	Description
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)	The CERCLA, commonly known as Superfund, was enacted by Congress on December 11, 1980. This law created a tax on the chemical and petroleum industries and provided broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. The CERCLA also enabled the revision of the National Contingency Plan (NCP). The NCP provided the guidelines and procedures needed to respond to releases and threatened releases of hazardous substances, pollutants, or contaminants. The NCP also established the National Priorities List. The Superfund Amendments and Reauthorization Act (SARA) of 1986 reauthorized the CERCLA to continue cleanup activities around the country. Several site-specific amendments, definitions clarifications, and technical requirements were added to the legislation, including additional enforcement authorities. Also, Title III of the SARA authorized the Emergency Planning and Community Right-to-Know Act (EPCRA).
EPCRA (42 USC Section 9601 et seq.)	The SARA of 1986 created the EPCRA (40 CFR Parts 350-372), also known as the SARA Title III, a statute designed to improve community access to information about chemical hazards and to facilitate the development of chemical emergency response plans by state/tribe and local governments. The EPCRA required the establishment of state/tribe emergency response commissions, responsible for coordinating certain emergency response activities and for appointing local emergency planning committees.
Fuels and Fuel Additive Program (40 CFR Part 79)	U.S. EPA regulates diesel fuels under two programs; one is administered under the Office of Pollution Prevention and Toxic Substances (OPPTS) and the other is administered under the Transportation and Air Quality group. OPPTS requires that all chemicals produced in the U.S. are registered with the TSCA. The Transportation and Air Quality group requires that any fuels sold for ground transportation purposes must be registered with U.S. EPA and the volumes reported on a quarterly basis.
State	
Hazardous Materials Transportation (Vehicle Code Sections 353; 2500-2505; 31303-31309; 32000-32053; 32100-32109; 31600-31620)	Regulations pertaining to the safe transport of hazardous materials are in Vehicle Code Sections 31301-31309. All motor carriers and drivers involved in transportation of hazardous materials must comply with the requirements contained in federal and State regulations, and must apply for and obtain a hazardous materials transportation license from the California Highway Patrol. A driver is required to obtain a hazardous materials endorsement issued by the driver's country or State of domicile to operate any commercial vehicle carrying hazardous materials. The driver is required to display placards or markings while hauling hazardous waste unless the driver is exempt from the endorsement requirements. A driver who is a California resident is required to obtain an endorsement from California Highway Patrol.
Hazardous Waste Control Law (Health and Safety Code, Division 20, Chapter 6.5, 22 CCR, Division 4.5)	California requirements for proper management of hazardous waste in California – this includes the generation, transportation, storage, treatment, recycling, and disposal of hazardous waste, including batteries. The Hazardous Waste Control Law and implementing regulations are administered and enforced by Department of Toxic Substances Control (DTSC).

Table A11: Applicable Laws and Regulations for Hazards and Hazardous Materials	
Regulations	Description
California Accidental Release Prevention (CalARP) Program (19 CCR Division 2, Chapter 4.5, Sections 2735-2785)	The purpose of the CalARP program is to prevent accidental releases of substances that can cause serious harm to the public and the environment, to minimize the damage if releases do occur, and to satisfy community right-to-know laws. This is accomplished by requiring businesses that handle more than a threshold quantity of a regulated substance listed in the regulations to develop a Risk Management Plan (RMP). An RMP is a detailed engineering analysis of the potential accident factors present at a business and the mitigation measures that can be implemented to reduce this accident potential.
Hazardous Material Business Plan & Area Plan Program (Health and Safety Code Sections 25500 – 25520; 19 CCR, Division 2, Chapter 4, Article 3 & 4)	The Business and Area Plans Program, relating to the handling and release or threatened release of hazardous materials, was established in California to protect the public health and safety and the environment. Basic information on the location, type, quantity, and the health risks of hazardous materials handled, used, stored, or disposed of in the state, which could be accidentally released into the environment, is not now available to firefighters, health officials, planners, public safety officers, health care providers, regulatory agencies, and other interested persons. The information provided by business and area plans is necessary in order to prevent or mitigate the damage to the health and safety of persons and the environment from the release or threatened release of hazardous materials into the workplace and environment. Certified Unified Program Agencies (CUPAs) use information collected from the Business Plan and CalARP programs to identify hazardous materials in their communities. This information provides the basis for the Area Plan and is used to determine the appropriate level of emergency planning necessary to respond to a release.
Unified Program Administration (Health and Safety Code, Chapter 6.11, Sections 25404-25404.8; 27 CCR, Division 1, Subdivision 4, Chapter 1, Sections 15100-15620)	<p>A CUPA, which is authorized by the Secretary of CalEPA to carry out several of the hazardous waste/hazardous materials regulatory programs administered by the State in a coordinated and consistent manner. The six-hazardous waste and materials program elements covered by the CUPA include:</p> <ol style="list-style-type: none"> 1) Hazardous Waste Generators 2) Underground Tanks 3) Above Ground Tanks 4) Accidental Release Program 5) Hazardous Material Release Response Plans & Spill Notification 6) Hazardous Materials Management Plans & Inventory Reporting <p>The intent of the CUPA is to simplify the hazardous materials regulatory environment and provide a single point of contact for businesses to address inspection, permitting, billing, and enforcement issues.</p>
Local	
Various Local Ordinances	Various ordinances and codes may be adopted at the local level to provide stricter requirements in the management of hazardous materials and waste activities within the jurisdiction.

10. HYDROLOGY AND WATER QUALITY

A. Existing Conditions

1. U.S.

The U.S. has a very diverse climate due to its wide range of geographic features. The climate is temperate in most of the U.S., subtropical in the southern region, tropical in Hawaii and in Florida, polar in Alaska, semi-arid in the Great Plains, arid in the Great Basin, and Mediterranean in California. Weather in the U.S. is influenced by the polar jet stream. The Great Basin and Columbia Plateau are arid and semi-arid, with annual precipitation averaging less than 15 inches. From July to September monsoons and thunderstorms affect the southwest and Great Basin region. The Cascades region is one of the snowiest places in the world, with some spots averaging over 600 inches of snow annually.

About 90 percent of public water systems in the U.S. obtain their water from groundwater. However, because systems served by groundwater tend to be much smaller than systems served by surface water, only 34 percent of Americans (101 million) are supplied with treated groundwater, while 66 percent (195 million) are supplied with surface water.

2. California

a) Surface Waters

Surface waters occur as streams, lakes, ponds, coastal waters, lagoons, estuaries, floodplains, dry lakes, desert washes, wetlands, and other collection sites. Water bodies modified or developed by man, including reservoirs and aqueducts, are also considered surface waters. Surface water resources are very diverse throughout the state, due to the high variance in tectonics, topography, geology/soils, climate, precipitation, and hydrologic conditions. Overall, California has the most diverse range of watershed conditions in the U.S., with varied climatic regimes ranging from Mediterranean climates with temperate rainforests in the north coast region to desert climates containing dry desert washes and dry lakes in the southern central region.

The average annual runoff for the State is 71 million acre-feet (DWR 2003). The State has more than 60 major stream drainages and more than 1,000 smaller, but significant drainages that drain coastal mountains and inland mountainous areas. High snowpack levels and resultant spring snowmelt yield high surface runoff and peak discharge in the Sierra Nevada and Cascade Mountains that feed surface flows, fill reservoirs, and recharge groundwater. Federal, state, and local engineered water projects, aqueducts, canals, and reservoirs serve as the primary conduits of surface water sources to areas that have limited surface water resources. Most of the surface water storage is transported for agricultural, urban, and rural residential needs to the San Francisco Bay Area and to cities and areas extending to southern coastal California. Surface water is also transported to southern inland areas, including Owens Valley, Imperial Valley, and Central Valley areas.

b) Groundwater

The majority of runoff from snowmelt and rainfall flows down mountain streams into low gradient valleys and either percolates into the ground or is discharged to the sea. This percolating flow is stored in alluvial groundwater basins that cover approximately 40 percent of the geographic extent of the State (DWR 2003). Groundwater recharge occurs more readily in areas underlain by coarse sediments, primarily in mountain base alluvial fan settings. As a result, most of California’s groundwater basins are located in broad alluvial valleys flanking mountain ranges, such as the Cascade Range, Coast Ranges, Transverse Ranges, and the Sierra Nevada.

There are 250 major groundwater basins that serve approximately 30 percent of California’s urban, agricultural, and industrial water needs, especially in southern portion of San Francisco Bay, the Central Valley, greater Los Angeles area, and inland desert areas where surface water is limited. On average, more than 15 million acre-feet of groundwater are extracted each year in the state, of which more than 50 percent is extracted from 36 groundwater basins in the Central Valley.

c) Water Quality

Land uses have a great effect on surface water and groundwater water quality in the State of California. Water quality degradation of surface waters occurs through nonpoint- and point-source discharges of pollutants. Nonpoint source pollution is defined as not having a discrete or discernible source and is generated from land runoff, precipitation, atmospheric deposition, seepage, and hydrologic modification (U.S. EPA 1993). Nonpoint-source pollution includes runoff containing pesticides, insecticides, and herbicides from agricultural areas and residential areas; acid drainage from inactive mines; bacteria and nutrients from septic systems and livestock; VOCs and toxic chemicals from urban runoff and industrial discharges; sediment from timber harvesting, poor road construction, improperly managed construction sites, and agricultural areas; and atmospheric deposition and hydromodification. In comparison, point-source pollution is generated from identifiable, confined, and discrete sources, such as a smokestack, sewer, pipe or culvert, or ditch. These pollutant sources are regulated by U.S. EPA and the State Water Resources Control Board (SWRCB) through RWQCBs. Many of the pollutants discharged from point-sources are the same as for nonpoint-sources, including municipal (bacteria and nutrients), agricultural (pesticides, herbicides, and insecticides), and industrial pollutants (VOCs and other toxic effluent).

B. Regulatory Setting

Applicable laws and regulations associated with hydrology, water quality, and water supply are discussed in Table A12.

Table A12: Applicable Laws and Regulations for Hydrology, Water Quality, and Water Supply	
Regulation	Description
Federal	

Table A12: Applicable Laws and Regulations for Hydrology, Water Quality, and Water Supply	
Regulation	Description
National Flood Insurance Program (FEMA)	Designated floodplain mapping program, flooding and flood hazard reduction implementation, and federal subsidized flood insurance for residential and commercial property. Administered by FEMA.
EO 11988	Requires actions to be taken for federal activities to reduce the risks of flood losses, restore and preserve floodplains, and minimize flooding impacts to human health and safety.
CWA	Administered primarily by U.S. EPA, the CWA pertains to water quality standards, state responsibilities, and discharges of waste to waters of the U.S. Sections 303, 401, 402, and 404.
CWA Section 303	Defines water quality standards consisting of: 1) designated beneficial uses of a water, 2) the water quality criteria (or “objectives” in California) necessary to support the uses, and 3) an antidegradation policy that protects existing uses and high-water quality. Section 303(d) requires states to identify water quality impairments where conventional control methods will not achieve compliance with the standards and establish total maximum daily load (TMDL) programs to achieve compliance.
CWA Section 401	State certification system for federal actions which may impose conditions on a project to ensure compliance with water quality standards.
CWA Section 402	Section 402 mandates permits for municipal stormwater discharges, which are regulated under the NPDES General Permit for Municipal Separate Storm Sewer Systems (MS4) (MS4 Permit). Several of the cities and counties issue their own NPDES municipal stormwater permits for the regulations of stormwater discharges. These permits require that controls are implemented to reduce the discharge of pollutants in stormwater discharges to the maximum extent possible, including management practices, control techniques, system design and engineering methods, and other measures as appropriate. As part of permit compliance, these permit holders have created Stormwater Management Plans for their respective locations. These plans outline the requirements for municipal operations, industrial and commercial businesses, construction sites, and planning and land development. These requirements may include multiple measures to control pollutants in stormwater discharge. During implementation of specific projects, applicants will be required to follow the guidance contained in the Stormwater Management Plans as defined by the permit holder in that location.
CWA Section 404	Permit system for dredging or filling activity in waters of the U.S., including wetlands, and administered by USACE.
National Toxics Rule and California Toxics Rule	Applicable receiving water quality criteria promulgated by U.S. EPA for priority toxic pollutants consisting generally of trace metals, synthetic organic compounds, and pesticides.
State	
California Water Rights	SWRCB administers review, assessment, and approval of appropriative (or priority) surface water rights permits/licenses for diversion and storage for beneficial use. Riparian water rights apply to the land and allow diversion of natural flows for beneficial uses without a permit, but users must share the resources equitably during drought. Groundwater management planning is a function of local government. Groundwater use by overlying property owners is not formally regulated, except in cases where the groundwater basin supplies are limited and

Table A12: Applicable Laws and Regulations for Hydrology, Water Quality, and Water Supply	
Regulation	Description
	uses have been adjudicated, or through appropriative procedures for groundwater transfers.
Public Trust Doctrine	Body of common law that requires the State to consider additional terms and conditions when issuing or reconsidering appropriative water rights to balance the use of the water for many beneficial uses irrespective of the water rights that have been established. Public trust resources have traditionally included navigation, commerce, and fishing and have expanded over the years to include protection of fish and wildlife, and preservation goals for scientific study, scenic qualities, and open-space uses.
Porter-Cologne Water Quality Control Act (Water Code Sections 13000 et seq. and Title 23)	SWRCB is responsible for statewide water quality policy development and exercises the powers delegated to the State by the federal government under the CWA. Nine RWQCBs adopt and implement water quality control plans (Basin Plans) which designate beneficial uses of surface waters and groundwater aquifers and establish numeric and narrative water quality objectives for beneficial use protection. RWQCBs issue waste discharge requirements for discharge activities to water and land, require monitoring and maintain reporting programs, and implement enforcement and compliance policies and procedures. Other State agencies with jurisdiction in water quality regulation in California include the Department of Pesticide Regulation, DTSC, CDFW, and OEHHA.
Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California	The State Implementation Policy provides implementation procedures for discharges of toxic pollutants to receiving waters.
Thermal Plan	The Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Water and Enclosed Bays and Estuaries of California was adopted by SWRCB in 1972 and amended in 1975. The Thermal Plan restricts discharges of thermal waste or elevated temperature waste to waters of the state. Generally, the Thermal Plan prohibits discharges from increasing ambient temperatures by more than 1°F over more than 25 percent of a stream cross section, increasing ambient temperatures by more than 4°F in any location, and prohibits discharge of waste that exceeds more than 20°F above the ambient temperature.
Statewide NPDES General Permit for Stormwater Associated with Land Disturbance and Construction Activity (Order No. 2009-0009-DWQ, NPDES No. CAR000002)	NPDES permit for stormwater and non-storm discharges from construction activity that disturbs greater than 1 acre. The general construction permit requires the preparation of a SWPPP that identifies Best Management Practices (BMPs) to be implemented to control pollution of storm water runoff. The permit specifies minimum construction BMPs based on a risk-level determination of the potential of the project site to contribute to erosion and sediment transport and sensitivity of receiving waters to sediment. While small amounts of construction-related dewatering are covered under the General Construction Permit, RWQCBs have also adopted a General Order for Dewatering and Other Low Threat Discharges to Surface Waters (General Dewatering Permit). This permit applies to various categories of dewatering activities and may apply to some construction sites, if

Table A12: Applicable Laws and Regulations for Hydrology, Water Quality, and Water Supply	
Regulation	Description
	construction of specific projects required dewatering in greater quantities than that allowed by the General Construction Permit and discharged the effluent to surface waters. The General Dewatering Permit contains waste discharge limitations and prohibitions similar to those in the General Construction Permit.
Statewide NPDES General Permit for Discharges of Stormwater Associated with Industrial Facilities (Order No. 97-003-DWQ, NPDES No. CAS000001)	NPDES permit for stormwater and non-storm discharges from types of industrial sites based on the Standard Industrial Classification. The general industrial permit requires the preparation of a SWPPP that identifies potential onsite pollutants, BMPs to be implemented, and inspection/monitoring.
SB 1168, Statutes of 2014 Chapter 346, Pavely	This bill requires all groundwater basins designated as high- or medium-priority basins by DWR that are designated as basins subject to critical conditions of overdraft to be managed under a groundwater sustainability plan or coordinated groundwater sustainability plans by January 31, 2020, and requires all other groundwater basins designated as high- or medium-priority basins to be managed under a groundwater sustainability plan or coordinated groundwater sustainability plans by January 31, 2022. This bill would require a groundwater sustainability plan to be developed and implemented to meet the sustainability goal, established as prescribed, and would require the plan to include prescribed components.
AB 1739, Statutes of 2014, Dickinson, Chapter 347	This bill establishes groundwater reporting requirements for a person extracting groundwater in an area within a basin that is not within the management area of a groundwater sustainability agency or a probationary basin. The bill requires the reports to be submitted to SWRCB or, in certain areas, to an entity designated as a local agency by SWRCB.
SB 1319, Statutes of 2014, Chapter 348, Pavely	This bill allows SWRCB to designate a groundwater basin as a probationary basin subject to sustainable groundwater management requirements. This bill also authorizes SWRCB to develop an interim management plan in consultation with DWR under specified conditions.
Mining and Mineral Policy Act	The Mining and Mineral Act of 1970 declared that the Federal Government policy is to encourage private enterprise in the development of a sound and stable domestic mineral industry, domestic mineral deposits, minerals research, and methods for reclamation in the minerals industry.
Local	
Water Agencies	Water agencies enter into contracts or agreements with the federal and State governments to protect the water supply and to ensure the lands within the agency have a dependable supply of suitable quality water to meet present and future needs.
Floodplain Management	General plans guide county land use decisions, and require the identification of water resource protection goals, objectives, and policies. Floodplain management is addressed through ordinances, land use planning, and development design review and approval. Local actions may be coordinated with FEMA for the National Flood Insurance Program. Typical provisions address floodplain use restrictions, flood protection requirement, allowable alteration of floodplains and stream

Table A12: Applicable Laws and Regulations for Hydrology, Water Quality, and Water Supply	
Regulation	Description
	channels, control of fill and grading activities in floodplains, and prevention of flood diversions where flows would increase flood hazards in other areas.
Drainage, Grading, and Erosion Control Ordinances	Counties regulate building activity under the federal Uniform Building Code, local ordinances, and related development design review, approval, and permitting. Local ordinances are common for water quality protection addressing drainage, stormwater management, land grading, and erosion and sedimentation control.
Environmental Health	RWQCBs generally delegate permit authority to county health departments to regulate the construction and operation/maintenance of on-site sewage disposal systems (e.g., septic systems and leach fields, cesspools).

11. LAND USE AND PLANNING

A. Existing Conditions

1. U.S.

The way physical landscapes are used or developed is commonly referred to as land use. Public agencies are the primary entities that determine the types of land use changes that can occur for specific purposes within their authority or jurisdiction. In most states, land use decisions are made by local governments. In incorporated areas, land use decisions are typically made by the city. In unincorporated areas, land use decisions are typically made by the county. Sometimes state, regional, or federal land management agencies also make land use decisions. Generally, State law establishes the framework for local planning procedures, which local governments follow in adopting their own set of land use policies and regulations in response to the unique issues they face.

2. California

In California, the State Planning and Zoning Law (Government Code Section 65000 et seq.) provides the primary legal framework that cities and counties must follow in land use planning and controls. Planned land uses are designated in the city or county general plan, which serves as the comprehensive master plan for the community. Also, city and county land use and other related resource policies are defined in the General Plan. The primary land use regulatory tool provided by the California Planning and Zoning Law is the zoning ordinance adopted by each city and county. Planning and Zoning Law requirements are discussed in the regulatory setting below.

When approving land use development, cities and counties must comply with CEQA, which requires that they consider the significant environmental impacts of their actions and the adoption of all feasible mitigation measures to substantially reduce significant impacts, in the event a project causes significant or potentially significant effects on the environment. In some

cases, building permits may be ministerial, and therefore exempt from CEQA, but most land use development approval actions by cities and counties require CEQA compliance.

Land use decisions in California are also be governed by State agencies such as the California Coastal Commission, California State Lands Commission, California Department of Parks and Recreation, and others, where the State has land ownership or permitting authority with respect to natural resources or other State interests.

B. Regulatory Setting

Applicable laws and regulations associated with land use and planning are discussed in Table A13.

Table A13: Applicable Laws and Regulations for Land Use and Planning	
Regulation	Description
Federal	
FLPMA	FLPMA is the principal law governing how BLM manages public lands. FLPMA requires BLM to manage public land resources for multiple use and sustained yield for both present and future generations. Under FLPMA, BLM is authorized to grant rights-of-way for generation, transmission, and distribution of electrical energy. Although local agencies do not have jurisdiction over the federal lands managed by BLM, under FLPMA and BLM regulations at 43 CFR Part 1600, BLM must coordinate its planning efforts with State and local planning initiatives. FLPMA defines an Area of Critical Environmental Concern (ACEC) as an area within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards. BLM identifies, evaluates, and designates ACECs through its resource management planning process. Allowable management practices and uses, mitigation, and use limitations, if any, are described in the planning document and the concurrent or subsequent ACEC Management Plan. ACECs are considered land use authorization avoidance areas because they are known to contain resource values that could result in denial of applications for land uses that cannot be designed to be compatible with management objectives and prescriptions for the ACEC.
RMPs	Established by FLPMA, RMPs are designed to protect present and future land uses and to identify management practices needed to achieve desired conditions within the management area covered by the RMPs. Management direction is set forth in the RMPs in the form of goals, objectives, standards, and guidelines. These, in turn, direct management actions, activities, and uses that affect land management, and water, recreation, visual, natural, and cultural resources.
NFMA	The NFMA is the primary statute governing the administration of national forests. The act requires the Secretary of Agriculture to assess forest lands, develop a management program based on multiple-use, sustained-yield principles, and implement a resource management plan for each unit of the National Forest System. Goal 4 of the USFS's National Strategic Plan for the National Forests states that the nation's forests and grasslands play a significant role in meeting America's need for producing and transmitting energy. Unless otherwise restricted, National Forest Service lands are available for energy exploration, development, and infrastructure

Table A13: Applicable Laws and Regulations for Land Use and Planning	
Regulation	Description
	(e.g., well sites, pipelines, and transmission lines). However, the emphasis on non-recreational special uses, such as utility corridors, is to authorize the special uses only when they cannot be reasonably accommodated on non-National Forest Service lands.
State	
State Planning and Zoning Law (Government Code Section 65300 et seq.)	Establishes the obligation of cities and counties to adopt and implement general plans. The general plan is a comprehensive, long-term, and general document that describes plans for the physical development of the city or county. The general plan addresses a broad range of topics, including, at a minimum, land use, circulation, housing, conservation, open space, noise, and safety. In addressing these topics, the general plan identifies the goals, objectives, policies, principles, standards, and plan proposals that support the city or county's vision for the area. The general plan is also a long-range document that typically addresses the physical character of an area over a 20-year period. Although the general plan serves as a blueprint for future development and identifies the overall vision for the planning area, it remains general enough to allow for flexibility in the approach taken to achieve the plan's goals.
Subdivision Map Act (Government Code section 66410 et seq.)	In general, land cannot be divided in California without local government approval. The primary goals of the Subdivision Map Act are: (a) to encourage orderly community development by providing for the regulation and control of the design and improvements of the subdivision with a proper consideration of its relation to adjoining areas; (b) to ensure that the areas within the subdivision that are dedicated for public purposes will be properly improved by the subdivider so that they will not become an undue burden on the community; and (c) to protect the public and individual transferees from fraud and exploitation. (61 Ops. Cal. Atty. Gen. 299, 301 (1978); 77 Ops. Cal. Atty. Gen. 185 (1994)). Dividing land for sale, lease or financing is regulated by local ordinances based on the State Subdivision Map Act (Government Code Section 66410 et seq.).
SB 375, Statutes of 2008	SB 375 augments the existing federal requirement for MPOs to develop RTPs for their respective regions. Under SB 375, MPOs must prepare an SCS to supplement their RTPs. RTP/SCSs contain land use strategies to reduce VMT-related emissions of GHGs. Following the adoption of an RTP/SCSs, land use strategies must be implemented at the local level by land use agencies.
Local	
General Plans	The most comprehensive land use planning is provided by city and county general plans, which local governments are required by State law to prepare as a guide for future development. The general plan contains goals and policies concerning topics that are mandated by State law or which the jurisdiction has chosen to include. Required topics are: land use, circulation, housing, conservation, open space, noise, and safety. Other topics that local governments frequently choose to address are public facilities, parks and recreation, community design, or growth management, among others. City and county general plans must be consistent with each other. County general plans must cover areas not included by city general plans (i.e., unincorporated areas).
Specific and Community Plans	A city or county may also provide land use planning by developing community or specific plans for smaller, more specific areas within their jurisdiction. These more localized plans provide for focused guidance for developing a specific area, with development standards tailored to the area, as well as systematic implementation of

Table A13: Applicable Laws and Regulations for Land Use and Planning	
Regulation	Description
	the general plan. Specific and community plans are required to be consistent with the city or county's general plan.
Zoning	The city or county zoning code is the set of detailed requirements that implement the general plan policies at the level of the individual parcel. The zoning code presents standards for different uses and identifies which uses are allowed in the various zoning districts of the jurisdiction. Since 1971, State law has required the city or county zoning code to be consistent with the jurisdiction's general plan, except in charter cities.
CEQA Guidelines Section 15332	CEQA Guidelines Section 15332 provides for certain types of infill projects that may be determined to be categorically exempt from CEQA review by local lead agencies. Infill projects that may be exempt from environmental review under this class of categorical exemption must: be consistent with the applicable general plan and zoning designations; be within city limits and on a parcel no greater than five acres; not contain valuable habitat for any federal or State listed species; not contribute to any significant effects to traffic, noise, or air and water quality; and be adequately served by existing utilities and public services.

12. MINERAL RESOURCES

A. Existing Conditions

1. International

Various countries export the mineral resources used in the production of lithium-ion batteries (e.g. lithium, cobalt, platinum) to international manufacturers. In 2016, Australia exported 14,300 tons of lithium, Chile exported 12,000 tons, Argentina exported 5,700 tons, and China exported 2,000. The U.S. currently imports lithium from Chile (57 percent), Argentina (40 percent), China (2 percent), and others (1 percent) (USGS, 2017a). Major suppliers of cobalt, a precious metal used in the manufacturing of batteries, include the Democratic Republic of the Congo, which exported 66,000 tons of cobalt in 2016; over half of the world's total supply of cobalt. Other countries include China (7,700 tons), Russia (6,200 tons), Canada (7,300 tons), and Australia (5,100 tons) (USGS, 2017b).

Additionally, platinum comprises an important component of catalytic converters found in hydrogen fuel cells. In 2016, South Africa exported 120,000 tons of platinum, Russia exported 23,000 tons, Zimbabwe exported 13,000 tons, Canada exported 9,000 tons, and U.S. 3,900. Currently, the U.S. imports platinum from South Africa (39 percent), Germany and the United Kingdom (13 percent each), Italy (7 percent), and other countries (28 percent). The U.S. also imports palladium from South Africa (27 percent), Russia (24 percent), Italy (13 percent), the United Kingdom (8 percent), and other countries (28 percent) (USGS, 2017c).

2. U.S.

Mineral resources are all the physical materials that are extracted from the earth for use. Modern society is dependent on a huge amount and variety of mineral resources. Mineral resources are classified as metallic or non-metallic. As measured by consumption, the most important metallic resources are iron aluminum, copper, zinc, and lead. The most important nonmetallic resources include crushed stone, sand and gravel, cement, clays, salt, and phosphate. Mineral reserves are known deposits of minerals that can be legally mined economically using existing technology.

3. California

The CGS classifies the regional significance of mineral resources in accordance with the California Surface Mining and Reclamation Act of 1975 and assists in the designation of land containing significant aggregate resources. MRZs have been designated to indicate the significance of mineral deposits. The MRZ categories follow:

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 significant mineral deposits are present, or where it is judged that a high likelihood exists for their presence.

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 to any other MRZ.

California ranks as 7th in the U.S. for non-fuel mineral production, accounting for approximately 3.9 percent of the nation's total. In 2011, there were approximately 700 active mineral mines that produced: sand and gravel, boron, Portland cement, crushed stone, gold, masonry cement, clays, gemstones, gypsum, salt, silver, and other minerals (Clinkenbeard and Smith 2013).

B. Regulatory Setting

Applicable laws and regulations associated with mineral resources are discussed in Table A14.

Table A14: Applicable Laws and Regulations for Mineral Resources	
Regulation	Description
Federal	
Mining and Mineral Policy Act	The Mining and Mineral Act of 1970 declared that the Federal Government policy is to encourage private enterprise in the development of a sound and stable domestic mineral industry, domestic mineral deposits, minerals research, and methods for reclamation in the minerals industry.

Table A14: Applicable Laws and Regulations for Mineral Resources	
Regulation	Description
State	
SMARA	The intent of SMARA of 1975 is to promote production and conservation of mineral resources, minimize environmental effects of mining, and to assure that mined lands will be reclaimed to conditions suitable for alternative uses. An important part of the SMARA legislation requires the State Geologist to classify land according to the presence or absence of significant mineral deposits. Local jurisdictions are given the authority to permit or restrict mining operations, adhering to the SMARA legislation. Classification of an area using MRZs to designate lands that contain mineral deposits are designed to protect mineral deposits from encroaching urbanization and land uses that are incompatible with mining. The MRZ classifications reflect varying degrees of mineral significance, determined by available knowledge of the presence or absence of mineral deposits as well as the economic potential of the deposits.
CBSC (24 CCR)	California's minimum standards for structural design and construction are given in the CBSC (24 CCR). The CBSC is based on the Uniform Building Code (International Code Council 1997), which is used widely throughout U.S. (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 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, proponents of specific projects would be required to comply with all provisions of the CBSC for certain aspects of design and construction.
PRC Sections 2762-2763	PRC Section 2762 states that the general plan must establish mineral resource management policies if the State Geologist has identified resources of statewide or regional significance within the city or county. PRC Section 2763 requires that city and county land use decisions affecting areas with minerals of regional or statewide significance be consistent with mineral resource management policies in the general plan, including protection of known mineral resources.
Local	
Local Grading and Erosion Control Ordinances	Many counties and cities have grading and erosion control ordinances. These ordinances are intended to control erosion and sedimentation caused by construction activities. A grading permit is typically required for construction-related projects. As part of the permit, project applicants usually must submit a grading and erosion control plan, vicinity and site maps, and other supplemental information. Standard conditions in the grading permit include a description of BMPs similar to those contained in a SWPPP.
City/County General Plans	Most city and county general plans have an element that addresses mineral resources within that jurisdiction.

13. NOISE

A. Existing Conditions

Acoustics is the scientific study that evaluates perception, propagation, absorption, and reflection of sound waves. Sound is a mechanical form of radiant energy, transmitted by a pressure wave through a solid, liquid, or gaseous medium. Sound that is loud, disagreeable, unexpected, or unwanted is generally defined as noise. Common sources of environmental noise and noise levels measured in decibels (dB) are presented in Table A15.

Table A15: Typical Noise Levels		
Common Outdoor Activities	Noise Level (dB)	Common Indoor Activities
	110	Rock band
Jet flyover at 1,000 feet	100	--
Gas lawnmower at 3 feet	90	--
Diesel truck moving at 50 mph at 50 feet	80	Food blender at 3 feet, Garbage disposal at 3 feet
Noisy urban area, Gas lawnmower at 100 feet	70	Vacuum cleaner at 10 feet, Normal speech at 3 feet
Commercial area, Heavy traffic at 300 feet	60	
Quiet urban daytime	50	Large business office, Dishwasher in next room
Quiet urban nighttime	40	Theater, Large conference room (background)
Quiet suburban nighttime	30	Library, Bedroom at night, Concert hall (background)
Quiet rural nighttime	20	Broadcast/Recording Studio
	10	--
Threshold of Human Hearing	0	Threshold of Human Hearing
Notes: dB=A-weighted decibels; mph=miles per hour Source: Caltrans 2013a: p.2-20.		

1. Sound Properties

A sound wave is initiated in a medium by a vibrating object (e.g., vocal chords, the string of a guitar, the diaphragm of a radio speaker). The wave consists of minute variations in pressure, oscillating above and below the ambient atmospheric pressure. The number of pressure variation cycles occurring per second is referred to as the frequency of the sound wave and is expressed in hertz.

Directly measuring sound pressure fluctuations would require the use of a very large and cumbersome range of numbers. To avoid this and have a more useable numbering system, the dB scale was introduced. A sound level expressed in decibels is the logarithmic ratio of two

like pressure quantities, with one pressure quantity being a reference sound pressure. For sound pressure in air the standard reference quantity is generally considered to be 20 micropascals, which directly corresponds to the threshold of human hearing. The use of the decibel is a convenient way to handle the million-fold range of sound pressures to which the human ear is sensitive. A decibel is logarithmic; it does not follow normal algebraic methods and cannot be directly summed. For example, a 65-dB source of sound, such as a truck, when joined by another 65 dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). A sound level increase of 10 dB corresponds to 10 times the acoustical energy, and an increase of 20 dB equates to a 100-fold increase in acoustical energy.

The loudness of sound perceived by the human ear depends primarily on the overall sound pressure level and frequency content of the sound source. The human ear is not equally sensitive to loudness at all frequencies in the audible spectrum. To better relate overall sound levels and loudness to human perception, frequency-dependent weighting networks were developed. The standard weighting networks are identified as A through E. There is a strong correlation between the way humans perceive sound and A-weighted sound levels (dBA). For this reason, the dBA can be used to predict community response to noise from the environment, including noise from transportation and stationary sources. Sound levels expressed as dB in this section are A-weighted sound levels, unless noted otherwise.

Noise can be generated by many sources, including mobile sources (i.e., transportation) such as automobiles, trucks, and airplanes and stationary sources (i.e., non-transportation) such as construction sites, machinery, and commercial and industrial operations. As acoustic energy spreads through the atmosphere from the source to the receiver, noise levels attenuate (i.e., decrease) depending on ground absorption characteristics, atmospheric conditions, and the presence of physical barriers. Noise generated from mobile sources generally attenuate at a rate of 4.5 dB per doubling of distance. Stationary noise sources spread with more spherical dispersion patterns that attenuate at a rate of 6 to 7.5 dB per doubling of distance.

Atmospheric conditions such as wind speed, turbulence, temperature gradients, and humidity may additionally alter the propagation of noise and affect levels at a receiver. Furthermore, the presence of a large object (e.g., barrier, topographic features, and intervening building façades) between the source and the receptor can provide significant attenuation of noise levels at the receiver. The amount of noise level reduction (i.e., shielding) provided by a barrier primarily depends on the size of the barrier, the location of the barrier in relation to the source and receivers, and the frequency spectra of the noise. Natural (e.g., berms, hills, and dense vegetation) and human-made features (e.g., buildings and walls) may be used as noise barriers.

All buildings provide some exterior-to-interior noise reduction. A building constructed with a wood frame and a stucco or wood sheathing exterior typically provides a minimum exterior-to-interior noise reduction of 25 dB with its windows closed, whereas a building constructed of a steel or concrete frame, a curtain wall or masonry exterior wall, and fixed plate glass windows of one-quarter-inch thickness typically provides an exterior-to-interior noise reduction of 30–40 dB with its windows closed (Caltrans 2011).

2. Common Noise Descriptors

The intensity of environmental noise fluctuates over time, and several different descriptors of time-averaged noise levels are used. The selection of a proper noise descriptor for a specific source depends on the spatial and temporal distribution, duration, and fluctuation of both the noise source and the environment. The noise descriptors most often in relation to the environment are defined below (Caltrans 2013a).

Equivalent Noise Level (L_{eq}): The equivalent steady-state noise level in a stated period of time that would contain the same acoustic energy as the time-varying noise level during the same period (i.e., average noise level).

Maximum Noise Level (L_{max}): The highest instantaneous noise level during a specified time.

Minimum Noise Level (L_{min}): The lowest instantaneous noise level during a specified time.

Day-Night Noise Level (L_{dn}): The 24-hour L_{eq} with a 10-dB penalty applied during the noise-sensitive hours from 10 p.m. to 7 a.m., which are typically reserved for sleeping.

Community Noise Equivalent Level (CNEL): Like the L_{dn} described above with an additional 5-dB penalty applied during the noise-sensitive hours from 7 p.m. to 10 p.m., which are typically reserved for relaxation, conversation, reading, and watching television.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the L_{eq} descriptor listed above, which corresponds to a steady-state A-weighted sound level containing the same total energy as a time-varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptors such as L_{dn} and CNEL, as defined above, and shows very good correlation with community response to noise.

3. Effects of Noise on Humans

Excessive and chronic exposure to elevated noise levels can result in auditory and non-auditory effects on humans. Auditory effects of noise on people are those related to temporary or permanent hearing loss caused by loud noises. Non-auditory effects of exposure to elevated noise levels are those related to behavioral and physiological effects. The non-auditory behavioral effects of noise on humans are associated primarily with the subjective effects of annoyance, nuisance, and dissatisfaction, which lead to interference with activities such as communications, sleep, and learning. The non-auditory physiological health effects of noise on humans have been the subject of considerable research attempting to discover correlations between exposure to elevated noise levels and health problems, such as hypertension and cardiovascular disease. The mass of research infers that noise-related health issues are predominantly the result of behavioral stressors and not a direct noise-induced response. The extent to which noise contributes to non-auditory health effects remains a subject of considerable research, with no definitive conclusions.

The degree to which noise results in annoyance and interference is highly subjective and may be influenced by several non-acoustic factors. The number and effect of these non-acoustic environmental and physical factors vary depending on individual characteristics of the noise environment such as sensitivity, level of activity, location, time of day, and length of exposure. One key aspect in the prediction of human response to new noise environments is the individual level of adaptation to an existing noise environment. The greater the change in the noise levels that are attributed to a new noise source, relative to the environment an individual has become accustomed to, the less tolerable the new noise source will be perceived.

With respect to how humans perceive and react to changes in noise levels, a 1-dB increase is imperceptible, a 3-dB increase is barely perceptible, a 6-dB increase is clearly noticeable, and a 10-dB increase is subjectively perceived as approximately twice as loud (Egan 2007:21). These subjective reactions to changes in noise levels was developed based on test subjects' reactions to changes in the levels of steady-state pure tones or broad-band noise and to changes in levels of a given noise source. It is probably most applicable to noise levels in the range of 50 to 70 dB, as this is the usual range of voice and interior noise levels. For these reasons, a noise level increase of 3 dB or more is typically considered substantial in terms of the degradation of the existing noise environment.

Negative effects of noise exposure include physical damage to the human auditory system, interference, and disease. Exposure to noise may result in physical damage to the auditory system, which may lead to gradual or traumatic hearing loss. Gradual hearing loss is caused by sustained exposure to moderately high noise levels over a period of time; traumatic hearing loss is caused by sudden exposure to extremely high noise levels over a short period. Gradual and traumatic hearing loss both may result in permanent hearing damage. In addition, noise may interfere with or interrupt sleep, relaxation, recreation, and communication. Although most interference may be classified as annoying, the inability to hear a warning signal may be considered dangerous. Noise may also be a contributor to diseases associated with stress, such as hypertension, anxiety, and heart disease. The degree to which noise contributes to such diseases depends on the frequency, bandwidth, and level of the noise, and the exposure time (Caltrans 2009).

4. Vibration

Vibration is the periodic oscillation of a medium or object with respect to a given reference point. Sources of vibration include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) and those introduced by human activity (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, (e.g., operating factory machinery or transient in nature, explosions). Vibration levels can be depicted in terms of amplitude and frequency, relative to displacement, velocity, or acceleration.

Vibration amplitudes are commonly expressed in peak particle velocity (PPV) or root-mean-square (RMS) vibration velocity. PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is typically used in the monitoring of transient and impact vibration and has been found to correlate well to the stresses experienced by buildings

(FTA 2006; Caltrans 2013b). PPV and RMS vibration velocity are normally described in inches per second (in/sec).

Although PPV is appropriate for evaluating the potential for building damage, it is not always suitable for evaluating human response. It takes some time for the human body to respond to vibration signals. In a sense, the human body responds to average vibration amplitude. The RMS of a signal is the average of the squared amplitude of the signal, typically calculated over a 1-second period. As with airborne sound, the RMS velocity is often expressed in decibel notation as vibration decibels (VdB), which serves to compress the range of numbers required to describe vibration (FTA 2006). This is based on a reference value of 1micro (μ) inch/second.

The typical background vibration-velocity level in residential areas is approximately 50 VdB. Groundborne vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels (FTA 2006).

Typical outdoor sources of perceptible groundborne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the groundborne vibration is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings. Construction activities could generate groundborne vibrations that potentially pose a risk to nearby structures. Constant or transient vibrations can weaken structures, crack facades, and disturb occupants (FTA 2006).

Construction vibrations can be transient, random, or continuous. Transient construction vibrations are generated by blasting, impact pile driving, and wrecking balls. Continuous vibrations result from vibratory pile drivers, large pumps, and compressors. Random vibration can result from jackhammers, pavement breakers, and heavy construction equipment. Table A16 describes the general human response to different levels of groundborne vibration-velocity levels.

Table A16: Human Response to Different Levels of Groundborne Noise and Vibration	
Vibration-Velocity Level	Human Reaction
65 VdB	Approximate threshold of perception.
75 VdB	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find that transportation-related vibration at this level is unacceptable.
85 VdB	Vibration acceptable only if there are an infrequent number of events per day.

Notes: VdB = vibration decibels referenced to 1 μ in/sec and based on the RMS velocity amplitude.

Source: FTA 2006: p. 7-8.

5. Sensitive Land Uses

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as parks, schools, historic sites, cemeteries, and recreation areas are also generally considered sensitive to increases in exterior noise levels. Places of worship and transit lodging, and other places where low interior noise levels are essential are also considered noise-sensitive. These types of receptors are also considered vibration-sensitive land uses in addition to commercial and industrial buildings where vibration would interfere with operations within the building, including levels that may be well below those associated with human annoyance.

B. Regulatory Setting

Applicable laws and regulations associated with noise are discussed in Table A17.

Table A17: Applicable Laws and Regulations for Noise	
Regulation	Description
Federal	
Federal Noise Control Act (1972) U.S. EPA (40 CFR 201-211)	This act established a requirement that all federal agencies administer their programs to promote an environment free of noise that jeopardizes public health or welfare. U.S. EPA was given the responsibility for providing information to the public regarding identifiable effects of noise on public health or welfare, publishing information on the levels of environmental noise that will protect the public health and welfare with an adequate margin of safety, coordinating federal research and activities related to noise control, and establishing federal noise emission standards for selected products distributed in interstate commerce. This act also directed that all federal agencies comply with applicable federal, state, interstate, and local noise control regulations.
Quiet Communities Act (1978)	This act promotes the development of effective State and local noise control programs, to provide funds for noise research, and to produce and disseminate educational materials to the public on the harmful effects of noise and ways to effectively control it.

Table A17: Applicable Laws and Regulations for Noise	
Regulation	Description
14 CFR, Part 150 (FAA)	These address airport noise compatibility planning and include a system for measuring airport noise impacts and present guidelines for identifying incompatible land uses. All land uses are considered compatible with noise levels of less than 65 dBA L _{dn} . At higher noise levels, selected land uses are also deemed acceptable, depending on the nature of the use and the degree of structural noise attenuation provided.
International Standards and Recommended Practices (International Civil Aviation Organization)	This contains policies and procedures for considering environmental impacts (e.g., aircraft noise emission standards and atmospheric sound attenuation factors).
32 CFR, Part 256 (Department of Defense Air Installations Compatible Use Zones (AICUZ) Program)	AICUZ plans prepared for individual airfields are primarily intended as recommendations to local communities regarding the importance of maintaining land uses which are compatible with the noise and safety impacts of military aircraft operations.
23 CFR, Part 772, Federal Highway Administration (FHWA) standards, policies, and procedures	FHWA standards, policies, and procedures provide procedures for noise studies and noise abatement measures to help protect the public health and welfare, to supply noise abatement criteria, and to establish requirements for information to be given to local officials for use in the planning and design of highways.
29 CFR, Part 1910, Section 1910.95 (U.S. Department of Labor Occupational Safety and Health Administration)	This regulation established a standard for noise exposure in the workplace.
FTA Guidance	This guidance presents procedures for predicting and assessing noise and vibration impacts of proposed mass transit projects. All types of bus and rail projects are covered. Procedures for assessing noise and vibration impacts are provided for different stages of project development, from early planning before mode and alignment have been selected through preliminary engineering and final design. Both for noise and vibration, there are three levels of analysis described. The framework acts as a screening process, reserving detailed analysis for projects with the greatest potential for impacts while allowing a simpler process for projects with little or no effects. This guidance contains noise and vibration impact criteria that are used to assess the magnitude of predicted impacts. A range of mitigation is described for dealing with adverse noise and vibration impacts.
49 CFR 210 (Federal Rail Administration (FRA) Railroad Noise Emission Compliance Standards) and FRA Guidance (2005)	This section and guidance provides contains criteria and procedures for use in analyzing the potential noise and vibration impacts of various types of high-speed fixed guideway transportation systems.
State	
CPUC Section 21670	The State Aeronautics Act of CPUC establishes statewide requirements for airport land use compatibility planning

Table A17: Applicable Laws and Regulations for Noise	
Regulation	Description
	and requires nearly every county to create an Airport Land Use Commission or other alternative.
California Airport Noise Regulations promulgated in accordance with the State Aeronautics Act (21 CCR Section 5000 et seq.)	In Section 5006, the regulations state that: “The level of noise acceptable to a reasonable person residing in the vicinity of an airport is established as a CNEL value of 65 dBA for purposes of these regulations. This criterion level has been chosen for reasonable persons residing in urban residential areas where houses are of typical California construction and may have windows partially open. It has been selected with reference to speech, sleep, and community reaction.
24 CCR, Part 2	These establish standards governing interior noise levels that apply to all new single-family and multi-family residential units in California. These standards require that acoustical studies be performed before construction at building locations where the existing L_{dn} exceeds 60 dBA. Such acoustical studies are required to establish mitigation that will limit maximum L_{dn} levels to 45 dBA in any habitable room.
Local	
City/County General Plan Noise Elements	<p>Local general plans in California must include a noise element per Government Code Section 65302(f).</p> <p>The General Plan Guidelines maintained and published by OPR provide detailed guidance to local agencies on standards and methods of analysis that should be used when developing or updating a noise element.</p> <p>Local governments must “analyze and quantify” noise levels and the extent of noise exposure through actual measurement or the use of noise modeling. Technical data relating to mobile and point sources must be collected and synthesized into a set of noise control policies and programs that “minimizes the exposure of community residents to excessive noise.” Noise level contours must be mapped, and the conclusions of the element used as a basis for land use decisions. The noise element must include implementation measures and possible solutions to existing and foreseeable noise problems. Furthermore, the policies and standards must be sufficient to serve as a guideline for compliance with sound transmission control requirements. The noise element directly correlates to the land use, circulation, and housing elements.</p> <p>A noise element is to be used as “a guide for establishing a pattern of land uses in the land use element that minimizes the exposure of community residents to excessive noise.” (OPR 2003)</p>
City/County Noise Regulations	Most local governments in California maintain and enforce noise regulations contained in local codes and ordinances

Table A17: Applicable Laws and Regulations for Noise	
Regulation	Description
	that apply to diverse types of activities in the community. These regulations may include noise standards that apply to construction activities associated with new development projects, as well as ongoing operational activities associated with existing or future land uses.

14. EMPLOYMENT, POPULATION, AND HOUSING

A. Existing Conditions

1. U.S.

The employed civilian labor force, unemployment rates, employment opportunities, and population estimates and projections for cities, counties, and states are collected every 10 years by the Census. The estimated population in 2017 for the U.S., was approximately 325,719,178 and the estimated number of housing units was 135,697,926 (Census 2018). The estimated average number of persons per household in 2017 was 2.64 in the U.S. in 2017 (Census 2018). The unemployment rate in the U.S. declined from 4.9 percent in January 2016 to 4.0 percent in June 2018. (Bureau of Labor Statistics (BLS) 2018a).

2. California

a) Population

According to the Census data, the estimated population of California in 2017 was 39,536,563 (Census 2018). Since California became a state in 1850, the population has been increasing rapidly. Within the first 150 years of California's statehood, the population increased from fewer than 100,000 citizens to almost 34 million in 2000 (University of California Davis 2001). It is expected that the population of California will reach and surpass the 50-million mark sometime between 2040 and 2050 if the current growth rates persist (University of Southern California 2012).

b) Housing

As population within the State increases, housing distribution and household conditions are expected to evolve. Estimated housing units, households, and vacancy rates for the State of California in 2013 are shown below in Table A18. Data was derived from the 2010 Census (Census 2018).

Table A18: California Housing Profile	
Total Housing Units	13,680,081
Total households	12,577,498
Vacant housing units	1,102,583

Owner-occupied	7,035,371
Renter-occupied	15,691,211
Homeowner vacancy rate	2.1
Rental vacancy rate	6.3
Source: Census 2018.	

c) Employment

In June 2018, the civilian labor force in California was approximately 19,341,000, and the unemployment rate decreased from 5.7 percent in January 2016 to 4.2 percent in June 2018 (BLS 2018b).

B. Regulatory Setting

See land use planning and housing-related regulations in Section 11.0, Land Use and Planning.

15. PUBLIC SERVICES

A. Existing Conditions

1. U.S.

U.S. EPA is charged with protecting human health and the environment, by writing and enforcing regulations based on laws passed by Congress. U.S. EPA Criminal Investigation Division's primary mission is the enforcement of U.S. environmental laws as well as any other federal law in accordance with the guidelines established by the Attorney General of the U.S. (18 USC 3063). These environmental laws include those specifically related to air, water, and land resources. USFS is an agency of USDA that administers the nation's 155 national forests and 20 national grasslands, including fire protection and response services. Major divisions of the agency include the National Forest System, State and Private Forestry, and the Research and Development branch. The Fire and Aviation Management part of USFS works to advance technologies in fire management and suppression, maintain and improve the extremely efficient mobilization and tracking systems in place, and reach out in support of federal, state, and international fire partners.

Education is primarily a State and local responsibility in the U.S. Communities, as well as public and private organizations, establish schools, develop curricula, and determine requirements for enrollment and graduation.

2. California

a) Law Enforcement

California's environmental laws are enforced by a matrix of State and local agencies, some at CalEPA, each charged with enforcing the laws governing a specific media such as air, water, hazardous waste, solid waste, and pesticide laws, the Attorney General's Office, local District Attorneys and City Attorneys. The Attorney General represents the people of California in civil and criminal matters before trial courts, appellate courts, and the supreme courts of California and the U.S. Regarding environmental issues, the Attorney General enforces laws that safeguard the environment and natural resources in the state. Recent actions by the Attorney General related to air quality and climate change issues include filing numerous actions against the Trump Administration opposing federal rollbacks of environmental protection regulations and requiring implementation of existing rules. These actions involve a range of regulations, including those concerning GHG emissions from stationary sources and vehicles, regulations of toxic air pollution, and planning requirements for criteria pollution planning. The Attorney General also continues to work broadly to support CARB actions, including working with local governments to ensure that land use planning processes take account of global warming, promoting renewable energy and enhanced energy efficiency in California, and working with other State leaders and agencies to implement AB 32, the Global Warming Solutions Act of 2006.

CalEPA was created in 1991 by Governor's EO. CalEPA's mission is to restore, protect and enhance the environment, to ensure public health, environmental quality, and economic vitality. CalEPA is composed of various boards, departments, and offices, including: CARB, Department of Pesticide Regulation, DTSC, OEHHA, and SWRCB (including the nine RWQCBs).

California's environmental laws are enforced by State and local agencies, each charged with enforcing the laws governing a specific media such as air, water, hazardous waste, solid waste, and pesticides. Enforcement agencies for these media are as follows:

- Air: CARB (part of CalEPA) and Local Air Districts.
- Water: SWRCB (part of CalEPA), RWQCBs (part of CalEPA), local waste water officials, and the California Department of Public Health.
- Hazardous Waste: DTSC (part of CalEPA) and CUPAs.
- Carcinogens/Reproductive Toxins: Prop. 65 through OEHHA (part of CalEPA).
- Pesticides: Department of Pesticide Regulation (part of CalEPA) and County Agricultural Commissioners

Statewide law enforcement service is provided by the California Highway Patrol, which is responsible for protecting State resources and providing crime prevention services and traffic enforcement along the State’s highways and byways.

Community law enforcement service is provided by local police and sheriff agencies (i.e., cities and counties, respectively) to prevent crime, respond to emergency incidents, and provide traffic enforcement on local roadways.

b) Fire Protection and Emergency Medical Response Services

State-level fire protection and emergency response service is provided by the California Department of Forestry and Fire Protection (CAL FIRE), primarily in rural areas of the State. CAL FIRE is an emergency response and resource protection department. CAL FIRE protects lives, property, and natural resources from fire, responds to emergencies of all types, and protects and preserves timberlands, wildlands, and urban forests.

Local and urban fire protection service is provided by local fire districts and/or local agencies (e.g., fire departments of cities and counties). In addition to providing fire response services most fire agencies also provide emergency medical response services (i.e., ambulance services) within their service areas.

3. Schools

Statewide, the regulation of education for youth is provided by the California Department of Education. The State Board of Education (SBE) is the governing and policy-making body of the California Department of Education. SBE sets K-12 education policy in the areas of standards, instructional materials, assessment, and accountability. Locally, school districts are responsible for the management and development of elementary, middle, and high-school facilities.

B. Regulatory Setting

Applicable laws and regulations associated with public services are discussed in Table A19.

Table A19: Applicable Laws and Regulations for Public Services	
Regulation	Description
Federal	
American with Disabilities Act	Guidelines to ensure that facilities are accessible to individuals with disabilities. Implements requirements for the design and construction of buildings.
State	
State Fire Responsibility Areas	Areas delineated by CAL FIRE for which the State assumes primary financial responsibility for protecting natural resources from damages of fire. Local jurisdictions are required to adopt minimum recommended requirements for road design, road identification, emergency fire suppression and fuel breaks and greenbelts. All projects within or adjacent to a State Fire Responsibility Area must meet these requirements.

State School Funding	Education Code Section 17620 authorizes school districts to levy a fee, charge, dedication, or other requirement for any development project for the construction or reconstruction of school facilities.
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16. RECREATION

A. Existing Conditions

1. U.S.

Recreational resources and facilities are provided and managed at federal, state, and local levels. The federal government manages a diverse array of recreational facilities and resources that include national parks and monuments, national forests and grasslands, wildlife refuges, wilderness areas, lakes and lands managed by different agencies in the federal government, wild and scenic rivers, and back country byways, national trails, and marine reserves and estuaries. Each federal agency's programs include recreation components.

2. California

California contain approximately 14,000 parks, managed by nearly 1,000 agencies (CSP 2018). The California Outdoor Recreation Plan and associated research provide policy guidance to all public agencies – federal, state, local, and special districts that oversee outdoor recreation on lands, facilities, and services throughout California. Agencies and departments that are involved in recreational activities include Boating and Waterways, Fish and Wildlife, Tahoe Regional Planning Association, various conservancies, and others.

Recreational lands and facilities are also managed by regional and local park and recreation agencies and open space districts. City and county general plans contain recreation elements that provide framework for planning agencies to consider when projects are developed and implemented.

B. Regulatory Setting

Applicable laws and regulations associated with recreation are discussed in Table A20.

Table A20: Applicable Laws and Regulations for Recreation	
Regulation	Description
Federal	
FLPMA, 1976 – 43 CFR 1600	Establishes public land policy; guidelines for administration; and provides for the “multiple use” management, protection, development, and enhancement of public lands. Multiple use management, defined as “management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people” with recreation identified as one of the resource values.
State	
	None applicable

Table A20: Applicable Laws and Regulations for Recreation	
Regulation	Description
Local	
General Plans	General plans for cities and counties contain designations for recreational areas. These are policy documents with planned land use maps and related information that are designed to give long-range guidance to those local officials making decisions affecting the growth and resources of their jurisdictions. Because of the number and variety of general plans and related local plans, they are not listed individually.

17. TRANSPORTATION AND TRAFFIC

A. Existing Conditions

1. U.S. and California

Existing roadway systems in the U.S. and California generally consist of highways, freeways, arterials, local streets, and intersections/ramps. The existing average annual daily traffic (AADT) volumes on the roadway segments that comprise these systems vary considerably (i.e., from hundreds to hundreds of thousands). The level of service (LOS), a scale used to determine the operating quality of a roadway segment or intersection based on volume-to-capacity ratio (V/C) or average delay, also vary from LOS A, the best and smoothest operating conditions, to LOS F, most congested operating conditions. Other roadway and traffic volume characteristics such as roadway length, number of lanes and facility type (e.g., two-lane freeway), right-of-way width and pavement width, terrain classification (e.g., flat), percent of heavy-duty truck traffic, and accident rates (e.g., number of accidents per million vehicle miles traveled) also vary substantially depending on the location. In addition to the roadway systems, circulation networks provide additional transportation opportunities and include mass transit, airports, and non-motorized travel (e.g., pedestrian and bicycle paths).

B. Regulatory Setting

Applicable laws and regulations associated with transportation and traffic are discussed in Table A21.

Table A21: Applicable Laws and Regulations for Transportation and Traffic	
Regulation	Description
Federal	
40 CFR, Part 77 (FAA)	Requires a determination of no hazard to air navigation for structures that will be more than 200 feet above ground level.
State	
SB 375, Statutes of 2008	The Sustainable Communities and Climate Protection Act of 2008 (Sustainable Communities Act, SB 375, Chapter 728, Statutes of 2008) supplements the requirements under the Federal-Aid Highway Act. In addition to preparing

Table A21: Applicable Laws and Regulations for Transportation and Traffic	
Regulation	Description
	RTPs, under SB 375, MPOs must develop SCSs that address VMT-related GHG emissions and include strategies to reduce emissions. Through the RTP/SCSs, MPOs allocate federal and State transportation funding to local and regional projects that would reduce VMT-related emissions.
SB 743, Statutes of 2013, Chapter 386	SB 743, passed in 2013, requires OPR to develop new CEQA guidelines that address traffic metrics under CEQA. As stated in the legislation, upon adoption of the new guidelines, “automobile delay, as described solely by level of service or similar measures of vehicular capacity or traffic congestion shall not be considered a significant impact on the environment pursuant to this division, except in locations specifically identified in the guidelines, if any.” CNRA is currently in the process of reviewing the updates to the CEQA Guidelines proposed by OPR.
Vehicle Code Sections 353; 2500-2505; 31303-31309; 32000-32053; 32100-32109; 31600-31620; Health and Safety Code Section 25160 et seq.	Regulates the highway transport of hazardous materials.
Vehicle Code Sections 13369; 15275 and 15278	Addresses the licensing of drivers and the classification of licenses required for the operation of particular types of vehicles and also requires certificates permitting operation of vehicles transporting hazardous materials.
Vehicle Code Sections 35100 et seq.; 35250 et seq.; 35400 et seq.	Specifies limits for vehicle width, height, and length.
Vehicle Code Section 35780	Requires permits for any load exceeding Caltrans weight, length, or width standards on public roadways.
California Streets and Highways Code Section 117, 660-672	Requires permits for any load exceeding Caltrans weight, length, or width standards on County roads.
California Streets and Highways Code Sections 117, 660-670, 1450, 1460 et seq., and 1480 et seq.	Regulate permits from Caltrans for any roadway encroachment from facilities that require construction, maintenance, or repairs on or across State highways and County roads.
CEQA (Public Resources Code CEQA Sections 21099(b)(2) and (c)(1))	CEQA Section 21099(b)(2) states that automobile delay, as described solely by level of service or similar measures of traffic congestion are not a significant environmental impact except in certain specified locations. Section 21099(c)(1) permits OPR to establish alternative metrics for assessing traffic impacts outside transit priority areas.
Local	
City/County Codes	Many local governments in California maintain and enforce local codes that apply standards to transportation facilities and services.

18. UTILITIES AND SERVICE SYSTEMS

A. Existing Conditions

1. U.S.

The U.S. Bureau of Reclamation (USBR) is a federal agency and it is the largest wholesaler of water in the U.S. and the second largest producer of hydroelectric power (USBR 2017). The Federal Power Commission regulates both the interstate transmission of electricity and the sale of hydroelectric power at the wholesale level in the U.S., and the Federal Energy Regulatory Commission (FERC) has authority over intrastate as well as interstate natural gas production.

2. California

a) Water Supply and Distribution

The principal water supply facilities in California are operated by USBR and DWR. In California, the Mid-Pacific Region of USBR is responsible for the management of the Central Valley Project (CVP). The CVP serves farms, homes, and industry in California's Central Valley as well as the major urban centers in the San Francisco Bay Area. The CVP consists of 20 dams and reservoirs, 11 power plants, and 500 miles of major canals and reaches from the Cascade Mountains near Redding in the north to the Tehachapi Mountains near Bakersfield in the south. In addition to delivering water for municipal and industrial uses and the environment, the CVP produces electric power and provides flood protection, navigation, recreation, and water quality benefits (USBR 2017).

DWR is a State agency that is responsible for managing and implementing the State Water Project (SWP). The SWP is a water storage and delivery system of reservoirs, aqueducts, power plants and pumping plants. Its main purpose is to store water and distribute it to 29 urban and agricultural water suppliers in Northern California, the San Francisco Bay Area, the San Joaquin Valley, the Central Coast, and Southern California (DWR 2018).

Local water districts, irrigation districts, special districts, and jurisdictions (e.g., cities and counties) manage and regulate the availability of water supplies and the treatment and delivery of water to individual projects. Depending on their location and the source of their supplies, these agencies may use groundwater, surface water through specific water entitlements, or surface water delivered through the CVP or SWP. In some remote areas not served by a water supply agency, individual developments may need to rely upon the underlying groundwater basin for their water supply. In these cases, the project would be required to secure a permit from the local or State land use authority and seek approval for development of the groundwater well(s).

b) Wastewater Collection and Treatment

SWRCB is the State agency responsible for the regulation of wastewater discharges to surface waters and groundwater via land discharge. SWRCB and nine RWQCBs are responsible for development and enforcement of water quality objectives and implementation plans that protect the beneficial uses of the federal and State waters. SWRCB also administers water rights in California. The RWQCB's are responsible for issuing permits or other discharge

requirements to individual wastewater dischargers and for ensuring that they are meeting the requirements of the permit through monitoring and other controls.

Wastewater collection, treatment, and discharge service for developed and metropolitan areas is typically provided by local wastewater service districts or agencies that may or may not be operated by the local jurisdiction (e.g., city or county). These agencies are required to secure treatment and discharge permits for the operation of a wastewater facility from the RWQCB. Wastewater is typically collected from a specific development and conveyed through a series of large pipelines to the treatment facility where it is treated to permitted levels and discharged to surface waters or the land.

In areas that are remote or that are not served by an individual wastewater service provider, developments would be required to install an individual septic tank or other on-site wastewater treatment system. These facilities would need to be approved by the local or State land use authority and the RWQCB.

c) Electricity and Natural Gas

CPUC regulates investor-owned electric and natural gas companies located within California. The CPUC’s Energy Division develops and administers energy policy and programs and monitors compliance with the adopted regulations.

Locally, energy service is provided by a public or private utility. New development projects would need to coordinate with the local service provider to ensure adequate capacity is available to serve the development.

d) Solid Waste Collection and Disposal

Statewide, the California Department of Resources Recycling and Recovery (CalRecycle), is responsible for the regulation of the disposal and recycling of all solid waste generated in California. CalRecycle acts as an enforcement agency in the approval and regulation of solid waste disposal and recycling facilities. Local agencies can create local enforcement agencies and, once approved by CalRecycle, they can serve as the enforcement agency for landfills and recycling facilities with their jurisdictions.

Local agencies or private companies own and operate landfill facilities and solid waste is typically hauled to these facilities by private or public haulers. Individual projects would need to coordinate with the local service provider and landfill to determine if adequate capacity exists to serve the project.

B. Regulatory Setting

Applicable laws and regulations associated with utilities are discussed in Table A22.

Table A22: Applicable Laws and Regulations for Utilities	
Regulation	Description
Federal	

Table A22: Applicable Laws and Regulations for Utilities	
Regulation	Description
Federal Power Act of 1935	In the Federal Power Act of 1935 (49 Stat. 803), created the Federal Power Commission, an independent regulatory agency with authority over both the interstate transmission of electricity and the sale of hydroelectric power at the wholesale level. The act requires the commission to ensure that electricity rates are “reasonable, nondiscriminatory and just to the consumer.” The Federal Power Act of 1935 also amended the criteria that the commission must apply in deciding whether to license the construction and operation of new hydroelectric facilities.
Natural Gas Act (NGA) of 1938	Together with the Federal Power Act of 1935, the NGA (P.L. 75-688, 52 Stat. 821) was an essential piece of energy legislation in the first half of the 20th century. These statutes regulated interstate activities of the electric and natural gas industries, respectively. The acts are similarly structured and constitute the classic form of command-and-control regulation authorizing the federal government to enter into a regulatory compact with utilities. In short, the NGA enabled federal regulators to set prices for gas sold in interstate commerce in exchange for exclusive rights to transport the gas.
Natural Gas Policy Act (NGPA) of 1978	The NGPA granted the FERC authority over intrastate as well as interstate natural gas production. The NGPA established price ceilings for wellhead first sales of gas that vary with the applicable gas category and gradually increase over time.
State	
Waste Heat and Carbon Emissions Reduction Act of 2007	The Waste Heat and Carbon Emissions Reduction Act of 2007 (AB 1613), placed requirements on CPUC, CEC, and local electric utilities to develop incentive programs and technical efficiency guidelines to encourage the installation of small CHP systems. CEC approved efficiency and certification guidelines for eligible systems under AB 1613 in January 2010, and CPUC approved standardized contracting and pricing provisions between CHP operators and the Investor Owned Utilities in November 2012.
AB 1900 (Statutes of 2012)	AB 1900 (Gatto, Chapter 602, Statutes of 2012) directed CPUC to adopt natural gas constituent standards (in consultation with CARB and OEHHA). The legislation is also designed to streamline and standardize customer pipeline access rules and encourage the development of statewide policies and programs to promote all sources of biomethane production and distribution.
Section 21151.9 of the PRC/ Water Code Section 10910 et seq.	Required the preparation of a water supply assessment (WSA) for large developments. These assessments are prepared by public water agencies responsible for providing service and address whether there are adequate existing and projected future water supplies to serve the proposed project. All projects that meet the qualifications for preparing a WSA must identify the water supplies and quantities that would serve the project as well as project the total water demand for the service area (including the project’s water demands) by source in 5-year increments over a 20-year period. This information must include data for a normal, single-dry, and multiple-dry years. The WSA is required to be approved by the water service agency before the project can be implemented.
Local	
City/County General Plan	<p>Local general plans in California must include a circulation element per Government Code Section 65302(b), which includes identification of the locations and extent of existing and proposed public utilities and facilities.</p> <p>The circulation element of a general plan should assess the adequacy and availability of community water, sewer, and drainage facilities and the need for expansion and improvements; trends in peak and average daily flows; the number and location of</p>

Table A22: Applicable Laws and Regulations for Utilities	
Regulation	Description
	existing and proposed power plants, oil and gas pipelines, and major electric transmission lines and corridors; existing and projected capacity of treatment plants and trunk lines; and potential future development of power plants (OPR 2003).
City/County Codes and Ordinances	Most cities and counties have adopted municipal codes and ordinances that pertain to utilities and service systems. Local codes and ordinances include, but not limited to, limitations on the locations of wells, sewers, and other water-related facilities; and development standards for future utility land use projects.

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ATTACHMENT B: SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

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ATTACHMENT B: SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
Aesthetics		
Short-Term Construction Related Impacts	<p>The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, and regulations, and policies that provide protection of aesthetic resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with discretionary local land use and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices routinely required to avoid and/or minimize impacts to aesthetic resources include:</p> <ul style="list-style-type: none"> Proponents of new or modified facilities constructed as a compliance response to the <u>ZEAS Zero-Emission Airport Shuttle Regulation</u> would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body shall certify that the environmental document was prepared in compliance with applicable regulations and approve the project for development. 	Potentially significant and unavoidable

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<ul style="list-style-type: none"> Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The project proponent would color and finish the surfaces of all project structures and buildings visible to the public to ensure that they: (1) minimize visual intrusion and contrast by blending with the landscape; (2) minimize glare; and (3) comply with local design policies and ordinances. The project proponent would submit a surface treatment plan to the lead agency for review and approval. To the extent feasible, the sites selected for use as construction staging and laydown areas shall be areas that are already disturbed and/or are in locations of low visual sensitivity. Where possible, construction staging and laydown areas for equipment, personal vehicles, and material storage shall be sited to take advantage of natural screening opportunities provided by existing topography and vegetation. All construction areas shall be kept clean and tidy, including the revegetating and regarding disturbed soil, and storage shall be screened from view and/or are generally not visible to the general public. Siting projects and their associated elements next to prominent landscape features or in a setting for observation 	

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<p>from national historic sites, national trails, and cultural resources shall be avoided to the greatest extent.</p> <ul style="list-style-type: none"> The project proponent shall prepare and implement a construction lighting mitigation plan and submit the plan to the local jurisdiction for review. The plan shall describes the measures to be used to reduce the visibility of on-site construction lighting from neighboring properties. 	
Long-Term Operational Impacts	<p>The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies that provide protection of aesthetic resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with discretionary local land use and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with discretionary project-approval authority. Recognized practices routinely required to avoid and/or minimize impacts to aesthetic resources include:</p> <ul style="list-style-type: none"> . Proponents of new or modified facilities constructed as a compliance response to the ZEAS<u>Zero-Emission Airport Shuttle</u> Regulation would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or 	Potentially significant and unavoidable

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<p>governing body shall certify that the environmental document was prepared in compliance with applicable regulations and approve the project for development.</p> <ul style="list-style-type: none"> • The project proponent shall color and finish the surfaces of all project structures and buildings visible to the public to ensure that they: (1) minimize visual intrusion and contrast by blending with the landscape; (2) minimize glare; and (3) comply with local design policies and ordinances. The project proponent shall submit a surface treatment plan to the lead agency for review and approval. • Siting projects and their associated elements next to prominent landscape features or in a setting for observation from national historic sites, national trails, and cultural resources shall be avoided to the greatest extent. • The project proponent shall prepare and implement a lighting mitigation plan and submit the plan to the local jurisdiction for review. The plan shall describe the measures to be used to reduce visibility of on-site lighting from neighboring properties. 	
Agriculture Resources		
Short-Term Construction-Related and Long-Term Operational-Related Impacts	The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies that provide protection of agricultural and forest resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities or infrastructure that would be approved by other State agencies or local jurisdictions. The ability to require such mitigation measures is within the purview of jurisdictions with	Potentially significant and unavoidable

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<p>discretionary land use approval and/or permitting authority. Project-specific impacts and mitigation would be identified during the project review process and carried out by agencies with discretionary project approval authority. Recognized practices routinely required to avoid and/or minimize construction-phase impacts to agriculture and forest resources include:</p> <ul style="list-style-type: none"> Proponents of new or modified facilities constructed as a result of reasonably foreseeable compliance responses would coordinate with local or State land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development. Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. Because CARB has no land use authority, mitigation is not within its purview to reduce potentially significant impacts to less-than-significant levels. Any mitigation specifically required for a new or modified facility would be determined by the local lead agency and future environmental documents by local and State lead agencies should include analysis of the following: <ul style="list-style-type: none"> Avoid lands designated as Important Farmland as defined by the Farmland Mapping and Monitoring Program. Before converting Farmland to non- 	

Summary of Environmental Impacts and Mitigation Measures		
Resource Area Impact Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<p>agricultural use, analyze the feasibility of using farmland that is not designated as Important Farmland prior to deciding on the conversion of Important Farmland.</p> <ul style="list-style-type: none"> • Avoid lands designated as forest land or timberland. Before converting forestland or timberland to non-forest use, analyze the feasibility of using other lands prior to deciding on the conversion of forest land or timberland. • Any mitigation for permanent conversion of Farmland caused by facility construction or modification shall be completed prior to the issuance of a grading or building permit by providing the permitting agency with written evidence of completion of the mitigation. Mitigation may include but is not limited to: <ul style="list-style-type: none"> • Permanent preservation of off-site Important Farmland (State defined Prime Farmland, Farmland of Statewide Importance, and Unique Farmland) of equal or better agricultural quality, at a ratio of at least 1:1. Preservation may include the purchase of agricultural conservation easement(s); purchase of credits from an established agricultural farmland mitigation bank; contribution of agricultural land or equivalent funding to an organization that provides for the preservation of Farmland towards the ultimate purchase of an agricultural conservation easement. 	

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<ul style="list-style-type: none"> Participation in any agricultural land mitigation program, including local government maintained, that provides equal or more effective mitigation than the measures listed. Any mitigation for permanent conversion of forest land or timberland caused by facility construction or modification shall be completed prior to the issuance of a grading or building permit by providing the permitting agency with written evidence of completion of the mitigation. Mitigation may include but is not limited to permanent preservation of forest land or timberland of equal or better quality, at a ratio of 1:1. Preservation may include purchase of easements or contribution of funds to a land trust or other agency. 	
Air Quality		
Short-Term Construction Related impacts	The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies that provide protection of air quality. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be subject to approval by local jurisdictions. The ability to require such measures is within the purview of jurisdictions with local or state land use approval and/or permitting authority. New or modified facilities in California would likely qualify as a “project” under CEQA, because they would generally need a discretionary public agency approval and could affect the physical environment. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the	Potentially significant and unavoidable

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<p>proposed action for compliance with CEQA. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices routinely required to avoid and/or minimize impacts to air quality include the following:</p> <ul style="list-style-type: none"> • Proponents of new or modified facilities constructed as a result of reasonably foreseeable compliance responses would coordinate with local or state land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local jurisdiction with land use authority would determine that the environmental review process complied with CEQA and other applicable regulations, prior to project approval. • Based on the results of the environmental review, proponents would implement all feasible mitigation identified in the environmental document to reduce or substantially lessen the construction-related air quality impacts of the project. • Project proponents would apply for, secure, and comply with all appropriate air quality permits for project construction from the local agencies with air quality jurisdiction and from other applicable agencies, if appropriate, prior to construction mobilization. • Project proponents would comply with the federal Clean Air Act and the California Clean Air Act (e.g., New Source Review and Best Available Control Technology criteria, if applicable). 	

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<ul style="list-style-type: none"> Project proponents would comply with local plans, policies, ordinances, rules, and regulations regarding air quality-related emissions and associated exposure (e.g., construction-related fugitive PM dust regulations, indirect source review, and payment into offsite mitigation funds). For projects located in PM nonattainment areas, prepare and comply with a dust abatement plan that addresses emissions of fugitive dust during construction and operation of the project. 	
Long-Term Operational Impacts		Beneficial
Odor Impacts		Less than significant
Biological Resources		
Short-Term Construction Related Impacts	<p>The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies that provide protection of biological resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local land use and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize impacts to biological resources include:</p>	Potentially significant and unavoidable

Summary of Environmental Impacts and Mitigation Measures		
Resource Area Impact Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<ul style="list-style-type: none"> Proponents of new or modified facilities constructed as a compliance response to the ZEAS<u>Zero-Emission Airport Shuttle Regulation</u> would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development. Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of actions required to mitigate potentially significant biological impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency. Preparation of a biological inventory of site resources by a qualified biologist prior to ground disturbance or construction. If protected species or their habitats are present, comply with applicable federal and State endangered species acts and regulations. Ensure that important fish or wildlife movement corridors or nursery sites are not impeded by project activities. Preparation of a wetland survey of onsite resources. Establish setbacks and prohibit disturbance of riparian habitats, streams, intermittent and ephemeral drainages, and other wetlands. Wetland delineation is required by 	

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<p>Section 3030(d) of the Clean Water Act and is administered by the U.S. Army Corps of Engineers.</p> <ul style="list-style-type: none"> Prohibit construction activities during the rainy season with requirements for seasonal weatherization and implementation of erosion prevention practices. Prohibit construction activities in the vicinity of raptor nests during nesting season or establish protective buffers and provide monitoring as needed to ensure that project activity does not cause an active nest to fail. Preparation of site design and development plans that avoid or minimize disturbance of habitat and wildlife resources, and prevents stormwater discharge that could contribute to sedimentation and degradation of local waterways. Depending on disturbance size and location, a National Pollution Discharge Elimination System (NPDES) construction permit may be required from the California State Water Resources Control Board. Plant replacement trees and establish permanently protection suitable habitat at ratios considered acceptable to comply with “no net loss” requirements. 	
Long-Term Operational Impacts	The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies that provide protection of biological resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local land use and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The	Potentially significant and unavoidable

Summary of Environmental Impacts and Mitigation Measures		
Resource Area Impact Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<p>jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize impacts to biological resources include:</p> <ul style="list-style-type: none"> Proponents of new or modified facilities constructed as a compliance response to the <u>ZEASZero-Emission Airport Shuttle Regulation</u> would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development. Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of actions required to mitigate potentially significant biological impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency. Prohibit vegetation management activities in the vicinity of raptor nests during nesting season or establish protective buffers and provide monitoring as needed to 	

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<p>ensure that project activity does not cause an active nest to fail.</p> <ul style="list-style-type: none"> • Maintain site design and development plan features that avoid or minimize disturbance of habitat and wildlife resources, and prevents stormwater discharge that could contribute to sedimentation and degradation of local waterways during project operation. • Maintain and replace, as needed replacement trees and permanently protected suitable habitat identified during the construction phase of the project. 	
Cultural Resources		
Short-Term Construction-Related Effects and Long-Term Operational-Related Impacts	<p>The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies that provide protection of cultural resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local land use and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize impacts to cultural resources include:</p> <ul style="list-style-type: none"> • Proponents of new or modified facilities constructed as a compliance response to the ZEAS<u>Zero-Emission Airport</u> 	Potentially significant and unavoidable

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<p><u>Shuttle</u> Regulation would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development.</p> <ul style="list-style-type: none"> • Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of actions required to mitigate potentially significant cultural impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency. • Retain the services of cultural resources specialists with training and background that conforms to the U.S. Secretary of Interior's Professional Qualifications Standards, as published in Title 36, Code of Federal Regulations, part 61 (36 CFR Part 61). • Conduct surveys of the project area and surroundings that may be affected by project activities to identify historical resources. Prepare a strategy for addressing impacts to known and unknown historical resources that may be affected by project construction, including avoidance and mitigation strategies in compliance with requirements of CEQA. 	

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<ul style="list-style-type: none"> • Seek guidance from the State and federal lead agencies, as appropriate, for coordination of Nation-to-Nation consultations with the Native American Tribes. • Consult with lead agencies early in the planning process to identify the potential presence of cultural properties. The agencies will provide the project developers with specific instruction on policies for compliance with the various laws and regulations governing cultural resources management, including coordination with regulatory agencies and Native American Tribes. • Retain the services of a paleontological resources specialist with training and background that conforms with the minimum qualifications for a vertebrate paleontologist as described in Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources (Society of Vertebrate Paleontology 2010). • Conduct initial scoping assessments to determine whether proposed construction activities would disturb formations that may contain important paleontological resources. Whenever possible potential impacts to paleontological resources shall be avoided by moving the site of construction or removing or reducing the need for surface disturbance. The scoping assessment shall be conducted by the qualified paleontological resources specialist in accordance with applicable agency requirements. • The project proponent's qualified paleontological resources specialist shall determine whether paleontological resources would likely be disturbed in a project area on the basis of the sedimentary context of the area and a records search for 	

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<p>past paleontological finds in the area. The assessment shall suggest areas of high known potential for containing resources. If the assessment is inconclusive a surface survey shall be conducted to determine the fossiliferous potential and extent of the pertinent sedimentary units within the project site. If the site contains areas of high potential for significant paleontological resources and avoidance is not possible, prepare a paleontological resources management and mitigation plan that addresses the following steps:</p> <ul style="list-style-type: none"> — a preliminary survey (if not conducted earlier) and surface salvage prior to construction; — physical and administrative protective measures and protocols such as halting work, to be implemented in the event of fossil discoveries; — monitoring and salvage during excavation; — specimen preparation; — identification, cataloging, curation and storage; and — a final report of the findings and their significance. — choose sites that avoid areas of special scientific value. 	
Energy Demand		
Short-Term Construction Related Impacts		Less than significant
Long-Term Operational Impacts		Beneficial

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
Geology, Soils and Minerals		
Short-Term Construction-Related and Long-Term Operational-Related impacts	<p>The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies that provide protection of geology and soils. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local land use and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize impacts to geology and soils include:</p> <ul style="list-style-type: none"> Proponents of new or modified facilities constructed as a compliance response to the ZEAS<u>Zero-Emission Airport Shuttle Regulation</u> would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development. Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of 	Potentially significant and unavoidable

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<p>actions required to mitigate potentially significant geology and soil impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.</p> <ul style="list-style-type: none"> • Prior to the issuance of any development permits, proponents of new manufacturing plants and hydrogen fueling stations would prepare a geotechnical investigation/study, which would include an evaluation of the depth to the water table, liquefaction potential, physical properties of subsurface soils including shrink-swell potential (expansion), soil resistivity, slope stability, minerals resources and the presence of hazardous materials. • Proponents of new manufacturing plants and hydrogen fueling stations would provide a complete site grading plan, and drainage, erosion, and sediment control plan with applications to applicable lead agencies. Proponents would avoid locating facilities on steep slopes, in alluvial fans and other areas prone to landslides or flash floods, or with gullies or washes, as much as possible. 	
<i>Greenhouse Gas Emissions</i>		
Short-Term Construction-Related and Long-Term Operational Impacts		Beneficial
<i>Hazards and Hazardous Materials</i>		
Short-Term Construction-Related Impacts	The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies related to hazards and hazardous materials. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require	Potentially significant and unavoidable

Summary of Environmental Impacts and Mitigation Measures		
Resource Area Impact Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<p>such measures is under the purview of jurisdictions with discretionary local land use and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with discretionary project approval authority. Recognized practices that are routinely required to avoid upset and accident-related impacts include:</p> <ul style="list-style-type: none"> Proponents of new or modified facilities constructed as a compliance response to the ZEAS<u>Zero-Emission Airport Shuttle Regulation</u> would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development. Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of actions required to mitigate potentially significant upset and accident-related hazard impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency. 	

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<ul style="list-style-type: none"> Handling of potentially hazardous materials/wastes shall be performed by or under the direction of a licensed professional with the necessary experience and knowledge to oversee the proper identification, characterization, handling and disposal or recycling of the materials generated as a result of the project. As wastes are generated, they shall be placed, at the direction of the licensed professional, in designated areas that offer secure, secondary containment and/or protection from stormwater runoff. Other forms of containment may include placing waste on plastic sheeting (and/or covering with same) or in steel bins or other suitable containers pending profiling and disposal or recycling. The temporary storage and handling of potentially hazardous materials/wastes shall be in areas away from sensitive receptors such as schools or residential areas. These areas shall be secured with chain-link fencing or similar barrier with controlled access to restrict casual contact from non-Project personnel. All project personnel that may encounter potentially hazardous materials/wastes shall have the appropriate health and safety training commensurate with the anticipated level of exposure. 	
Long-Term Operational-Related Impacts	Because the authority to determine project-level impacts and require project-level mitigation lies with the land use approval and/or permitting agency for individual projects, and that the programmatic analysis does not allow project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation ultimately implemented to reduce the potentially significant impacts.	Potentially significant and unavoidable

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
<i>Hydrology and Water Quality</i>		
Short-Term Construction Related Impacts	<p>The Regulatory Setting in Appendix A includes, but is not limited to, applicable laws, regulations, and policies in regard to hydrology and water quality. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local discretionary land use and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with discretionary project-approval authority. Recognized practices that are routinely required to avoid and/or mitigate hydrology and water quality-related impacts include:</p> <ul style="list-style-type: none"> Proponents of new or modified facilities constructed as a compliance response to the ZEAS<u>Zero-Emission Airport Shuttle Regulation</u> would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development. Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of 	Potentially significant and unavoidable

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<p>actions required to mitigate potentially significant hydrology and water quality impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency. Implement Best Management Practices to reduce sedimentation and pollution of surface waters, such as installation of silt fencing around the perimeter of active construction areas.</p> <ul style="list-style-type: none"> • Train construction workers for proper response to hazardous materials spills as well as responsibilities for maintaining BMPs on site. • Drainage plans for runoff shall be designed to contain adequate capacity for projected flows on site. • Avoid filling of waters of the U.S. and waters of the State to the extent feasible. If activities require a WDR or Section 401 Water Quality Certification, comply with all avoidance, reduction, and compensatory measures. 	
Long-Term Operational-Related Impacts	<p>Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this EA does not attempt to address project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts.</p>	Potentially significant and unavoidable

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
<i>Land Use and Planning</i>		
Short-Term Construction-Related and Long-Term Operational-Related Impacts	Potential environmental effects associated with land use change on agriculture and forestry, biology, geology and soils, and hydrology and their related mitigation measures are discussed in further detail under Impacts 2-1, 4-1, 4-2, 7-2, and 10-1.	
<i>Mineral Resources</i>		
Short-Term Construction-Related Impacts		Less than significant
Operational-Related Impacts	<p>The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies that provide protection of mineral resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California would most likely qualify as a “project” under CEQA. The jurisdiction with primary discretionary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation measures would be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize impacts to mineral resources include:</p> <ul style="list-style-type: none"> Proponents of construction activities implemented because of reasonably foreseeable compliance responses associated with the <u>ZEAS Zero-Emission Airport Shuttle</u> Regulation would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary 	Potentially significant and unavoidable

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<p>environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.</p> <ul style="list-style-type: none"> • Based on the results of the environmental review, proponents will implement all feasible mitigation to reduce or substantially lessen the potentially significant impacts on mineral resources associated with the project. • Actions required to mitigate potentially significant mineral resource impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency. • Prior to the issuance of any development permits, proponents of new or modified facilities or infrastructure will prepare an investigation/study, which will include an evaluation of the development's impact on the availability of mineral resources valuable to the region and residents of the state or delineated on a local general plan, specific plan, or other land use plan. • Proponents of new or modified facilities or infrastructure will provide a complete site plan showing any overlapping areas between the proposed plan and locally-important mineral resources delineated on a local general plan, specific plan, or other land use plan. Proponents will avoid locating facilities that would result in the loss of 	

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	availability of locally-important mineral resources, as much as possible.	
Noise		
Short-Term Construction-Related Impacts	<p>The Regulatory Setting in Appendix A includes, but is not limited to, applicable laws, regulations, and policies that pertain to noise. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local discretionary land use and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with discretionary project-approval authority. Recognized practices that are routinely required to avoid and/or minimize noise include:</p> <ul style="list-style-type: none"> Proponents of new or modified facilities constructed as a compliance response to the <u>ZEASZero-Emission Airport Shuttle</u> Regulation would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development. 	Potentially significant and unavoidable

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<ul style="list-style-type: none"> Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of actions required to mitigate potentially significant noise impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency. Ensure noise-generating construction activities (including truck deliveries, pile driving and blasting) are limited to the least noise-sensitive times of day (e.g., weekdays during the daytime hours) for projects near sensitive receptors. Consider use of noise barriers, such as berms, to limit ambient noise at property lines, especially where sensitive receptors may be present. Ensure all project equipment has sound-control devices no less effective than those provided on the original equipment. All construction equipment used would be adequately muffled and maintained. Ensure all stationary construction equipment (i.e., compressors and generators) is located as far as practicable from nearby sensitive receptors or shielded. Properly maintain mufflers, brakes and all loose items on construction and operational-related vehicles to minimize noise and ensure safe operations. Keep truck operations to the quietest operating speeds. Advise about downshifting 	

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<p>and vehicle operations in sensitive communities to keep truck noise to a minimum.</p> <ul style="list-style-type: none"> • Use noise controls on standard construction equipment; shield impact tools. • Consider use of flashing lights instead of audible back-up alarms on mobile equipment. • Install mufflers on air coolers and exhaust stacks of all diesel and gas-driven engines. 	
Long-Term Operational-Related Impacts	<p>The Regulatory Setting in Appendix A includes, but is not limited to, applicable laws, regulations, and policies that pertain to noise. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local discretionary land use and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with discretionary project-approval authority. Recognized practices that are routinely required to avoid and/or minimize noise include:</p> <ul style="list-style-type: none"> • Proponents of new or modified facilities constructed as a compliance response to the <u>ZEASZero-Emission Airport Shuttle Regulation</u> would coordinate with local land use agencies to seek entitlements for development including the 	Potentially significant and unavoidable

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<p>completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development.</p> <ul style="list-style-type: none"> Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of actions required to mitigate potentially significant noise impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency. Equip all emergency pressure relief valves and steam blow-down lines with silencers to limit noise levels. Contain facilities within buildings or other types of effective noise enclosures. Employ engineering controls, including sound-insulated equipment and control rooms, to reduce the average noise level in normal work areas. 	
<i>Population and Housing</i>		
Short-Term Construction-Related and Long-Term Operational-Related Impacts		Less than significant
<i>Public Services</i>		
Short-Term Construction-Related and Long-Term Operational-Related Impacts		Less than significant

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
<i>Recreation</i>		
Short-Term Construction-Related and Long-Term Operational-Related Impacts		Less than significant
<i>Transportation and Traffic</i>		
Short-Term Construction-Related Impacts	<p>The Regulatory Setting in Appendix A includes, but is not limited to, applicable laws, regulations, and policies related to transportation. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with discretionary land use and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with discretionary project-approval authority. Recognized practices that are routinely required to avoid and/or minimize construction traffic impacts include:</p> <ul style="list-style-type: none"> Proponents of new or modified facilities constructed as a compliance response to the <u>ZEAS Zero-Emission Airport Shuttle Regulation</u> would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development. 	Potentially significant and unavoidable

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<ul style="list-style-type: none"> Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of actions required to mitigate potentially significant traffic impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency. Minimize the number and length of access, internal, service and maintenance roads and use existing roads when feasible. Provide for safe ingress and egress to/from the proposed project site. Utilize flaggers where necessary to control traffic at site entrances during construction. Prepare a Construction Traffic Control Plan and a Traffic Management Plan. Encourage carpooling to the site. Avoid materials deliveries during peak traffic periods. 	
Long-Term Operational-Related Impacts	The Regulatory Setting in Appendix A includes, but is not limited to, applicable laws, regulations, and policies related to transportation. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with discretionary land use and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action	Potentially significant and unavoidable

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<p>is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with discretionary project-approval authority. Recognized practices that are routinely required to avoid and/or minimize construction traffic impacts include:</p> <ul style="list-style-type: none"> • Identify and implement road and intersection design requirements or improvements for any proposed or significantly impact roads and intersections. • Consult with and implement recommendations from local fire protection services regarding emergency access requirements. • Encourage alternative transportation and carpooling to the project site. 	
Utilities and Service Systems		
Long-Term Operational-Related Impacts	<p>The Regulatory Setting in Appendix A includes, but is not limited to, applicable laws, regulations, and policies related to utilities and service systems. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be subject to approval by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with discretionary land use and/or permitting authority. New or modified facilities in California would qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation would be identified during the environmental review by agencies with discretionary project-approval authority.</p>	Potentially significant and unavoidable

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<p>Recognized practices that are routinely required to avoid and/or minimize utility and service-related impacts include:</p> <ul style="list-style-type: none"> Proponents of new or modified facilities constructed as a compliance response to the <u>ZEASZero-Emission Airport Shuttle Regulation</u> would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development. Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of actions required to mitigate potentially significant utility or service-related impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency. Comply with local plans and policies regarding the provision of water supply, wastewater treatment, and storm water drainage utilities, and solid waste services. Where an on-site wastewater system is proposed, submit a permit application to the appropriate local jurisdiction and include the application with applications to appropriate lead agencies. Where appropriate, prepare a Water Supply Assessment (WSA) consistent with the requirements of Section 21151.9 	

Summary of Environmental Impacts and Mitigation Measures		
<i>Resource Area Impact</i> Significance before Mitigation	Potential Mitigation	Significance after Mitigation
	<p>of the Public Resources Code/ Section 10910 et seq. of the Water Code. The WSA would be approved by the local water agency/purveyor prior construction of the project.</p> <ul style="list-style-type: none">• Comply with local plans and policies regarding the provision of wastewater treatment services.	