APPENDIX B

DRAFT ENVIRONMENTAL ANALYSIS FOR THE ADVANCED CLEAN CARS PROGRAM

APPENDIX B

Draft Environmental Analysis

prepared for the

Advanced Clean Cars Program

Analyzing Amendments to California's Low-Emission Vehicle Criteria Pollutant and Greenhouse Gas (LEV III), Zero Emission Vehicle (ZEV), and Clean Fuels Outlet (CFO) Regulations

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Table of Contents

ES. EXECUTIVE SUMMARY

This document is an Environmental Analysis (EA) that evaluates the environmental impacts of the proposed Advanced Clean Cars (ACC) Program. The proposed ACC Program represents a new approach to controlling emissions from passenger vehicles, i.e., passenger cars (PCs), light-duty trucks (LDTs), and medium-duty vehicles (MDVs), by combining the control of smog and soot "criteria" air pollutants and their precursors, toxic air contaminants, and greenhouse gases (GHGs) into a coordinated regulatory package. Thus, the EA structure and analysis recognize the interdependent technologies that manufacturers would apply to passenger motor vehicles to respond to the coordinated regulatory program as a whole, along with the resultant environmental impacts.

A. OVERVIEW OF ADVANCED CLEAN CARS PROGRAM

Despite significant progress in reducing smog-forming and particulate matter emissions from the passenger vehicle fleet, California needs further reductions to meet health-based, State and federal ambient air quality standards. In addition, climate change continues to pose a serious threat to the economic well-being, public health, natural resources, and the environment of California.

To address the challenge presented by climate change and to meet the State's goal of an 80 percent reduction in GHG emissions by 2050, as expressed in Executive Order S-3-05, vehicular GHG emissions must be drastically reduced. This 40-year outlook is a far longer time horizon than those employed by the federal agencies under the Clean Air Act (CAA), or federal agency requirements to develop corporate average fuel economy (CAFE) standards. Policies developed under this longer timeframe deliver a continuous message to both the manufacturers and consumers that California is committed to significant changes to clean up the cars and lights trucks we drive.

Over the past three years California has worked with federal agencies to ensure that stringent criteria pollutant and GHG standards for light- and medium-duty vehicles, if adopted, will help achieve the dramatic reductions that meet California's needs. Together, these standards will provide consumers with the next generation of vehicles, designed to reduce multiple pollutants, while preserving vehicle choice and saving money.

1. California's Advanced Clean Cars Program and Its Economic Benefits

Continuing its leadership role in developing innovative and ground-breaking emission control programs, Air Resources Board (ARB) staff has developed the ACC Program. It is a pioneering approach consisting of a "package" of regulations that, although separately constructed, reflect prior practice and achieve synergy by addressing both ambient air quality needs and climate change in a coordinated manner.

The ACC Program combines three programs to control smog-forming, particulate matter, TAC, and GHG emissions in a single coordinated package of requirements for model years 2015 through 2025. One goal is to promote the development of environmentally superior cars that will continue to deliver the performance**,** utility, and safety vehicle owners have come to expect. The three programs involve amendments to existing regulations for Low-Emission Vehicles (LEV III), Zero Emission Vehicles (ZEV), and Clean Fuels Outlets (CFO). To achieve further criteria emission reductions from the passenger vehicle fleet, staff is proposing several amendments representing a significant strengthening of the existing LEV program. The LEV amendments include improvements to consumer labeling, patterned on California's revolutionary environmental performance label (EPL), to provide important emissions information in a graphical, easy-to-understand format. The ZEV program will act to focus vehicle technology development by requiring manufacturers to produce increasing numbers of ZEVs and plug-in hybrid electric vehicles in the 2018-2025 model years. Proposed amendments to the CFO regulation that will assure ultra-clean fuels, such as hydrogen, are available to meet vehicle demands resulting from the projected increase in number of ZEVs operating in the State.

The proposed ACC Program is intended to generate economic benefits for California. The State is a clear leader in innovation and venture capital investment, which will benefit from the ACC package. California received over half of all clean-tech venture capital investments in the U.S. in the last quarter and is well poised to continue to serve as an economic hub for technology and job creation related to clean vehicles in the coming years. These regulations, especially the ZEV rules, are creating the jobs of the 21st century now in California.

Three innovative automakers have opened businesses in California, and are pushing the market forward, creating jobs in the process. Tesla Motors has resurrected auto manufacturing in California by purchasing and retooling the former NUMMI plant in Fremont, California to produce its Model S sedan. Operation of the Tesla facility is expected to create about 1,000 manufacturing jobs. CODA Automotive opened its new global headquarters in Los Angeles, which will allow the company to grow significantly in coming years. The company also has an assembly plant in Benicia, California, where final assembly of its sedan occurs. Southern California is also home to the global headquarters of ZEV producer, Fisker Automotive, as well as engineering and design facilities for many larger automakers and their clean cars programs.

In addition to job-forming benefits through the automakers, additional economic benefit can be derived from other employment generation and from the effects of the ACC Program on reduced fuel and vehicle operating costs for consumers. The job and economic center of the plug-in electric vehicle charging sector is in California, which is expected to produce additional jobs in the State. In the tradition of California's innovation-driven economy, these companies are helping to develop the early market for ZEVs with novel financing and charging options. Fuel cost savings and other vehicle operating cost savings will materialize for the California consumer as a result of the ACC Program. Cost savings increase consumer purchasing power over time by

returning funds to them for other economic purposes. The resulting effect can be an overall increase in economic output and job creation in the State. As the vehicle fleet and fuels industry respond to the new standards, economic modeling suggests an increasingly positive economic impact to the State, leading to thousands of additional jobs this decade, and tens of thousands in the next.

2. Greenhouse Gas Emissions Goals

Recognizing the increasing threat of climate change to the well-being of Californians and the environment, in 2002 the Legislature adopted and the Governor signed AB 1493 (Chapter 200, Statutes 2002, Pavley). AB 1493 directed ARB to adopt the maximum feasible and cost-effective reductions in GHG emissions from light-duty vehicles. Vehicle GHG emissions included carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) that are emitted from the tailpipe, as well as emissions of HFC134a, the refrigerant then used in most vehicle air conditioning systems.

As directed by AB 1493, ARB adopted what is commonly called the Pavley regulations, the first in the nation to require significant reductions of GHGs from motor vehicles. These regulations, covering the 2009 - 2016 and later model years, call for a 17 percent overall reduction in GHG emissions from the light-duty fleet by 2020 and a 25 percent overall reduction by 2030. They also formed the foundation for the federal GHG and fuel economy programs for light-duty vehicles for 2012-2016 model years.

After the Board adopted the Pavley regulations, the Legislature adopted and the Governor signed AB 32, the California Global Warming Solutions Act (Chapter 488, Statutes 2006, Nuñez/Pavley.) AB 32 charges ARB with the responsibility of monitoring and regulating GHG emissions in the State. AB 32 also directed ARB to prepare a Scoping Plan outlining the State's strategy to achieve the maximum feasible and cost-effective reductions in furtherance of reducing GHG emissions to 1990 levels by 2020. Measure T1 of the Scoping Plan anticipates an additional 3.8 million metric tons of carbon dioxide equivalent (MMT CO_2e) reduction from the passenger vehicle fleet by 2020 beyond the reductions from the 2009 - 2016 AB 1493 standards.

Although originally part of the LEV program, ARB established the ZEV program as a stand-alone regulation in 1999, in recognition of the increasing maturity of zero emission technologies and the critical role they can play in achieving California's air quality standards and GHG reduction goals. Since then, the program has been modified several times to address the pace of development of zero emission technologies. At its March 2008 hearing, the Board directed staff to redesign the 2015 and later model year ZEV program by strengthening the requirement and focusing primarily on zero emission technologies, i.e., battery electric vehicles (BEV), hydrogen fuel cell vehicles (HFCV), and plug-in hybrid electric vehicles, to ensure that these low GHG technology vehicles transition from the demonstration phase to full commercialization in a reasonable timeframe to meet long-term emission reduction goals.

Beyond 2025, the driving force for lowering GHG emissions in California will be climate change. To meet the State's 80 percent GHG reduction goal by 2050, the new vehicle feet will need to be primarily composed of advanced technology vehicles by 2035 to have nearly an entire advanced technology fleet by 2050, including both new and used vehicles. Accordingly, the ACC Program coordinates the goals of the LEV, ZEV, and CFO programs to lay the foundation for the commercialization and support of these ultra-clean vehicles.

3. Criteria Emission Standards

To achieve further criteria emission reductions from the passenger vehicle fleet, ARB staff is proposing several amendments representing a significant strengthening of the LEV program. The major elements of the proposed LEV III program are:

- A reduction of fleet average emissions of new PCs, LDTs, and medium-duty passenger vehicles (MDPVs) to super ultra-low-emission vehicle (SULEV) levels by 2025.

- The replacement of separate NMOG and oxides of nitrogen (NO_X) standards with combined NMOG plus NO_X standards. The combined ROG and NOx standard will decline (e.g., from 0.100 for passenger cars and light-duty trucks and 0.119 for light-duty trucks and medium-duty passenger vehicles in 2015 to 0.030 for all vehicle categories by 2030).

- More stringent particulate matter (PM) standards for light- and medium-duty vehicles.

- An increase of full useful life durability requirements from 120,000 miles to 150,000 miles, which guarantees vehicles operate longer at these extremely low emission particulate levels.

- A backstop to assure continued production of super ultra-low-emission vehicles after PZEVs as a category is moved from the ZEV to the LEV program in 2018.

- Zero fuel evaporative emission standards for PCs and LDTs, and more stringent evaporative standards for MDVs.

4. Greenhouse Gas Emission Standards

For the 2017 - 2025 model year standards, ARB proposes to use the U. S. Environmental Protection Agency (U.S. EPA) approach and adopt separate standards for CO_2, CH_4, and N_2O. The proposed GHG emission standards would reduce new passenger vehicles carbon dioxide (CO_2) emissions from their model year 2016 levels by approximately 34 percent by model year 2025, from about 251 to about 166 grams of CO_2 per mile (gCO_2/mile), based on the projected mix of vehicles sold in California. The basic structure of the standards includes two categories, passenger

cars and light-duty trucks that are consistent with federal categories for light-duty vehicles. The standard targets would reduce car CO_2 emissions by about 36 percent and truck CO_2 emissions by about 32 percent from model year 2016 through 2025.

The CH_4 and N_2O standards will reflect the same stringency as the original GHG standards. The net result is, like the current 2009 - 2016 California GHG standards, the proposed 2017 - 2025 standards account for all major sources of vehicle GHG emissions, including upstream emissions associated with vehicle fuels. In addition, California is proposing to align its vehicle air conditioning system requirements with federal requirements.

5. Phasing In Maximum Feasible and Cost-Effective Technologies

Vehicle manufacturers need sufficient lead time to implement new technologies across their vehicle lines both from a feasibility and cost-effectiveness standpoint. Manufacturers will be resource challenged over the next 15 years as they strive to develop and implement technologies ranging from advanced gasoline and diesel engines to electric and fuel cell vehicles, while at the same time lowering criteria emissions of their combustion engines. The phase-in of the ACC Program requirements recognizes this by providing manufacturers with significant lead time and considerable compliance flexibility.

The technology for controlling vehicle emissions is well understood and manufacturers have a wide range of emission control technologies available to achieve “near-zero-at-the-tailpipe” (SULEV) emissions. Many of these technologies are already being used today on vehicles meeting LEV II requirements, and staff anticipates that with ongoing improvements to the effectiveness of these technologies, particularly catalyst technology, manufacturers will be able to meet the proposed requirements for smog forming emissions under the LEV III element of the ACC package. For some vehicles, specifically the heavier vehicles with larger displacement engines, additional emission control componentry, such as secondary air and hydrocarbon absorbers may be required to achieve the proposed emission levels.

The proposed GHG standards are also predicated on many existing and emerging technologies that increase engine and transmission efficiency, reduce vehicle energy loads, improve auxiliary and accessory efficiency, and recognize increasingly electrified vehicle subsystems with hybrid and electric drivetrains. Many technologies reduce both criteria emissions and GHGs, with this synergy enhancing technologies, cost effectiveness and demonstrating the importance of California analyzing the passenger vehicle fleet program as a whole.

Previous rulemakings (i.e., California’s 2009 - 2016 and federal 2012 - 2016 standards) established an original technical basis for the proposed GHG standards. This rulemaking builds on this existing technical foundation with new technical data and the understanding of evolving state-of-the-art engine, transmission, hybrid, and electric-drive technologies. As part of this effort, and without conceding any of California’s

separate authority, staff has been working with the U.S. EPA and the National Highway Traffic Safety Administration (NHTSA) since early last year to develop a unified national GHG program for motor vehicles beyond 2016. Importantly, while California proposes accepting national program compliance at manufacturers' option, California is doing so because it believes the proposed standards are stringent enough to meet State GHG emission reduction goals.

B. Environmental Impacts

The EA presents a programmatic evaluation of a full range of environmental impact topics related to implementation the proposed ACC Program. The EA discusses both beneficial and adverse effects on the environment as a result of the projected compliance responses to the proposed regulatory amendments, such as changes in State's vehicle fleet mix, uses of different technologies, construction of fuel outlets and relevant manufacturing facilities, and resulting reductions of pollutant emissions. A summary of key findings is presented below.

1. Criteria Emissions Reductions

Reduction of criteria air pollutant emissions is a substantial, beneficial, environmental impact of implementing the ACC Program. Table ES-1 provides the emission benefits for calendar years 2023, 2025, 2035, and 2040 for the criteria pollutants, reactive organic gas (ROG), oxides of nitrogen (NO_X), and particulate matter ($PM_{2.5}$) respectively. Emission benefits are fully realized in the 2035 - 2040 timeframe when nearly all vehicles operating in the fleet are expected to be compliant with the proposed ACC standards. By 2035, statewide ROG emissions would be reduced by an additional 34 percent, NOx emissions by an additional 37 percent, and $PM_{2.5}$ emissions by 10 percent from the baseline.

Table ES-1 Statewide Emission Benefits of the ACC Program: Reactive Organic Gas (ROG), Oxides of Nitrogen (NO_X) and Particulate Matter ($PM_{2.5}$)

Calendar Year	Adjusted Baseline	Proposed Regulation	Benefits	Percent Reduction
Statewide ROG (tons/day)				
2023	189.6	182.9	6.6	3%
2025	175.5	164.44	11.1	6%
2035	141.1	93.6	47.4	34%
Statewide NO_X (tons/day)				
2023	201.3	185.6	15.7	8%
2025	183.6	161.2	22.4	12%
2035	136.8	86.4	50.4	37%
Statewide $PM_{2.5}$ (tons/day)				
2023	26.7	26.0	0.6	2%

Table ES-1 Statewide Emission Benefits of the ACC Program: Reactive Organic Gas (ROG), Oxides of Nitrogen (NO_X) and Particulate Matter ($PM_{2.5}$)				
Calendar Year	**Adjusted Baseline**	**Proposed Regulation**	**Benefits**	**Percent Reduction**
2025	27.2	26.3	0.9	3%
2035	29.7	26.8	2.9	10%

2. GHG Emission Reductions

Reduction of GHG emissions is another substantial, beneficial, environmental impact of implementing the proposed ACC Program, including reductions in CAPs, GHG, and TACs. Table ES-2 provides the emission benefits for calendar years 2020, 2025, 2035, and 2050 for GHG. By 2025, CO_2 equivalent emissions would be reduced by almost 14 Million Metric Tons (MMT) per year, which is 12 percent from baseline levels. Carbon dioxide equivalent is a standardized measurement unit used to compare the emissions from various GHGs based upon their global warming potential. The reduction increases in 2035 to 32 MMT/Year, a 27 percent reduction from baseline levels. By 2050, the proposed regulation will reduce emissions by more than 42 MMT/Year, a reduction of 33 percent from baseline levels. Viewed cumulatively over the life of the regulation (2017-2050), the proposed ACC program would reduce emissions by more than 870 MMT CO_2e.

Table ES-2 Statewide GHG Emission Benefits of the ACC Program (with Rebound)				
Calendar Year	**Adjusted Baseline**	**Proposed Regulation**	**Benefits**	**Percent Reduction**
Statewide GHG Emissions (tons/day)				
2020	111.2	108.1	3.1	3%
2025	109.9	96.3	13.7	12%
2035	114.8	83.2	31.5	27%
2050	131.0	88.3	42.7	33%

3. Other Environmental Impacts

In addition to the analysis of changes in air pollutant emissions, the EA evaluates the potential direct and indirect environmental effects of implementation of the proposed ACC Program in relation to a full spectrum of other environmental resources topics. The primary sources of these impacts are the compliance responses to the proposed regulatory amendments that cause changes in the physical environment. Potential changes to the physical environment would result primarily from landscape disturbance

occurring from constructing and operating fueling facilities required for compliance with the proposed CFO regulation amendments or battery manufacturing facilities expected to be needed to achieve compliance with the proposed ZEV regulation amendments.

The EA examined all the environmental topics presented in the environmental checklist contained in Appendix G of the CEQA Guidelines. When potentially significant environmental impacts are identified, feasible mitigation measures have been presented to substantially reduce the effects. ARB does not, however, possess the authority to require project-specific mitigation measures for facilities approved by other land use or permitting agencies. Because the authority to determine project-level impacts and require project-level mitigation lies with the land use and/or permitting agency for individual projects, and 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, this EA takes the conservative approach in its post-mitigation significance conclusions (i.e., tending to overstate impacts) and, for CEQA compliance purposes, discloses that potentially significant impacts related to the development of fueling stations and new or modified manufacturing facilities may be significant and unavoidable. ARB expects, however, that as the proposed ACC Program is carried out, these significant impacts can and should be resolved and reduced to insignificance by other government agencies, in accordance with their authorities and project review procedures.

Among the range of environmental issues addressed in the EA, the following topics contained potentially significant environmental effects that may be unavoidable: aesthetics, biology, cultural resources, geology and soils, hazards (accidental releases), hydrology and water quality, noise, traffic (construction), and utilities. Only less-than-significant environmental effects would occur related to the following topics: agriculture and forest resources, land use and planning, mineral resources, population and housing, and recreation. As noted previously, substantial beneficial environmental effects would result from implementation of the proposed ACC Program related to air quality and GHG emissions.

1.0 INTRODUCTION AND BACKGROUND

This document is an Environmental Analysis (EA) that provides an evaluation of the environmental impacts of the proposed Advanced Clean Cars (ACC) Program. The proposed ACC Program represents a new approach to controlling emissions from passenger vehicles (i.e., passenger cars [PC], light-duty trucks [LDT1 and LDT2], and medium-duty vehicles [MDV]) by combining the control of smog-causing, toxic air contaminants (TACs), criteria air pollutants and precursors (CAPs) and greenhouse gas (GHGs) into a single coordinated regulatory package.

The proposed ACC Program consists of amendments to the following regulations:

- Low-Emission Vehicle Criteria Pollutant and Greenhouse Gas (LEV III),
- Zero Emission Vehicle (ZEV), and
- Clean Fuels Outlet (CFO).

The proposed California Evaporative Emission Regulations; Manufacturer Size Definition Changes; Environmental Performance Label (EPL); On-Board Diagnostic System Requirement for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines; and the E10 Certification Fuel are part of LEV III.

Additional details about the proposed amendments to these regulations are provided in Chapter III (Project Description). Three separate Regulatory Notices and Staff Reports (Initial Statement of Reasons) have been prepared for these proposed LEV III, ZEV, and CFO amendments and will be presented to the Board with a single coordinated analysis of emissions and the associated environmental impacts and benefits as presented in this EA.

If adopted, the proposed regulatory amendments would integrate the requirements for reducing CAPs and GHGs from cars and light-duty trucks for model years 2015- 2025 in California. These requirements would apply to the vehicle types listed in Table 1-1. For the purposes of this environmental impact analysis, these vehicle classes are collectively referred to as “light- and medium-duty vehicles.”

A description of the background, standards, and requirements of the existing LEV I and II, ZEV, and CFO regulations, along with detailed information about the proposed amendments, is also provided in the respective Staff Reports.

Table 1-1. Vehicle Types Subject to the Advanced Clean Cars Program	
Vehicle Type	**Example Models**
Passenger Cars (all weights)	Honda Fit, Ford Fusion, Chrysler 300, Chrysler Sebring, Chevrolet Malibu, Toyota Camry, Dodge Avenger
Light-Duty Trucks	
Light-Duty Truck 1 (0-3,750 lb LVW)	Ford Ranger, Ford Escape, Toyota RAV4, Jeep Compass, Hyundai Tucson, Mitsubishi Outlander, Nissan Rogue
Light-Duty Truck 2 (3,751 lb LVW – 8,500 lb GVWR)	Ford F150, Chevrolet Tahoe, Dodge Caravan
Medium-Duty Vehicles (8,501 – 14,000 lb GVWR)	Ford F250 and F350 Ford Club Wagon, Chevrolet 2500 and 3500 Silverado, GMC 2500 and 3500 Sierra, and Savana and Express Vans, Chrysler 2500 and 3500 Ram Trucks
Notes: There are several classifications for vehicles based on weight. Different measures of weight are considered. Curb weight is defined as the actual weight of the vehicle without carrying any load. Loaded vehicle weight (LVW) is defined as the curb weight plus 300 pounds (lb). Gross vehicle weight rating (GVWR) is the maximum, designed loaded weight of the vehicle. This means the curb weight of the vehicle plus a full payload.	

A. ARB's Certified Regulatory Program and Environmentally Mandated Projects under the California Environmental Quality Act

1. CEQA Requirements Under ARB's Certified Regulatory Program

The California Air Resources Board (ARB or the Board) is the lead agency for the proposed ACC Program and has prepared this EA pursuant to its California Environmental Quality Act (CEQA) Certified Regulatory Program. Public Resources Code (PRC) Section 21080.5 allows public agencies with regulatory programs to prepare a plan or other written document in lieu of an environmental impact report or negative declaration once the Secretary of the Resources Agency has certified the regulatory program. ARB's regulatory program was certified by the Secretary of the Resources Agency (California Code of Regulation [CCR], Title 14, hereafter "CEQA Guidelines" Section 15251[d]). As required by ARB's Certified Regulatory Program, and the policy and substantive requirements of CEQA, ARB has prepared this EA to assess the potential for significant adverse and beneficial environmental impacts associated with the proposed action and to provide a succinct analysis of those impacts (CCR, Title 17, Section 60005[a] and [b]). The resource areas from the CEQA Guidelines Environmental Checklist (Appendix G) were used as a framework for assessing potentially significant impacts. In accordance with ARB's Certified Regulatory Program, for proposed regulations this EA is included in the package prepared for the rulemaking (CCR, Title 17, Section 60005).

ARB has determined that adoption and implementation of the proposed ACC Program is a "project" as defined by CEQA. CEQA Guidelines (CCR, Title 14, Section 15378[a]) 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." Although the policy aspects and regulation amendments of the proposed ACC Program do not directly change the physical environment, the proposed ACC Program qualifies as a project under CEQA because it has the potential to result in a reasonably foreseeable indirect physical change in the environment from compliance responses to the regulations.

Furthermore, the requirements of PRC Section 21159 apply when ARB adopts a rule or regulation requiring the installation of pollution control equipment, or a performance standard or treatment requirement. For such projects, the CEQA Guidelines (CCR, Title 14, Section 15187) require ARB to conduct "an environmental analysis of the reasonably foreseeable methods by which compliance with that rule or regulation will be achieved." 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. The analysis should not engage in speculation and the detail of a project-level analysis is not required.

2. Public Review Process for the EA

In accordance with CCR, Title 17, Sections 60005 and 60007 and consistent with ARB's commitment to public review and input on regulatory actions, this EA is subject to a public review process through the posting of a Staff Report. The Staff Report, including this EA, is being posted for a public review period that begins on December 12, 2011 and ends at the close of the hearing on this item at the Board's regularly scheduled hearing set for January 26, 2012. This period complies with regulatory requirements for a minimum 45-day public review.

To conclude the public review period, the Board will hold a hearing on the proposed regulations. At the hearing, the Board will consider the Staff Report, including the EA and public comments received during the review period. The Board may accept, modify, or reject the staff recommendation for the proposed ACC Program. If modifications are requested, staff will address the changes and release the revised package, or relevant parts thereof, for one or more additional 15-day review and comment periods. At the conclusion of review(s), staff will compile all comments and responses, including any comments on the EA. The comments and written responses to comments, including environmental comments, will be incorporated into the Final Statement of Reasons (FSOR) for the regulation.

When the FSOR and full regulatory package are completed, including all public comments and responses to comments, they will be reviewed for final consideration and action at a subsequent Board meeting prior to transmittal to the Executive Officer and forwarding to the Office of Administrative Law for processing. However, because the U. S. Environmental Protection Agency (U.S. EPA) is concurrently working on a National Program and this program may influence ARB's decision, the conclusion of

ARB's consideration of the proposed ACC Program in California may be affected by the progress and outcome of relevant federal rulemakings announced for completion in 2012. Consequently, the Board may reserve its final action on this proposed regulation, including consideration of the EA and written responses to environmental comments, until after the federal rulemakings are substantially complete.

If the regulations are adopted, a Notice of Decision will be posted on ARB's website and filed with the Secretary of the Natural Resources Agency for public inspection.

B. Project Background

1. Previous Rulemakings

Light- and medium-duty vehicles are major contributors to emissions of CAPs and GHGs in California, and further reductions are needed for California to achieve mandated national and State ambient air quality standards for CAPs. GHG emission reductions are also needed from these vehicles to help meet the mandate established by Assembly Bill (AB) 32, Statutes of 2006. AB 32 calls for the reduction in statewide GHG emissions to 1990 levels by 2020. Additionally, former Governor Schwarzenegger's Executive Order S-3-05 requires further reductions of statewide GHG emissions to 80 percent below 1990 levels by 2050. Finally, AB 1493 (Chap. 200, Statutes of 2002) requires GHG emission reductions from California's passenger fleet.

Traditionally, CAPs from these vehicles have been controlled by two regulatory programs: 1) the LEV regulations designed to maximize emission reductions from light- and medium-duty vehicles and 2) ZEV regulations designed to encourage the development of very clean, advanced vehicle technologies. While operating essentially as separate regulations, significant synergies exist between the LEV and ZEV regulations, as well as between these vehicle programs and the CFO fuels program.

The previous LEV, ZEV, and CFO rulemakings are discussed in greater detail below.

a. Low-Emission Vehicle Criteria Pollutant and Greenhouse Gas (LEV III)

i. Criteria Pollutants

The LEV regulation was first adopted in 1990 and is now commonly referred to as LEV I. LEV I phased in a set of fleet-average emission standards for CAPs emitted by light-duty vehicles for model years 1994-2003, including PCs, LDTs, and MDVs. In 1999, ARB adopted a set of amendments to the LEV I regulation, known as LEV II. LEV II established a set of emission standards for model years 2004-2010 that were generally more stringent than the standards under LEV I and required the then increasingly popular class of sport utility vehicles (SUVs) to meet the same emission standards as passenger cars. The standards established by LEV II are in effect today. The requirements of LEV I and LEV II are included in CCR, Title 13, Sections

1960 - 1962, respectively. LEV-certified vehicles must also meet the evaporative standards in CCR, Title 13, Section 1976(b).

The CAPs regulated under LEV II include non-methane organic gas (NMOG), carbon monoxide (CO), oxides of nitrogen (NO_X), particulate matter, and non-methane hydrocarbons (NMHC). Formaldehyde, which is a TAC, is also regulated. LEV II addresses both exhaust emissions from vehicle tailpipes and evaporative emissions, which occur when fuel contained in the vehicle's fuel system evaporates and escapes into the surrounding air. LEV II also includes tailpipe emission standards for particulate matter generated by motor vehicles. LEV II also amended the test procedures required for manufacturers to demonstrate compliance. The California Supplemental Federal Test Procedure (SFTP) that addressed emissions resulting from aggressive operation, typified by high speeds and hard accelerations, and from air conditioner (AC) use was also adopted.

LEV II contains two major elements. One element consists of emission standard tiers to which various vehicle classes must certify. The other element consists of fleet-average emission standards. Fleet-average emission standards apply to the average emission rates of the various vehicle models marketed by a manufacturer, weighted by the number of vehicles sold or leased by the manufacturer in each vehicle class. Both the vehicle emission standards and fleet-average emission standards of LEV II became increasingly stringent for later model years from 2004 to 2010.

In meeting the fleet-average standards, manufacturers may certify their vehicles to any of the applicable emission standards as long as the fleet-average emissions of their new vehicles meet the fleet-average emission requirements for that model year. This flexibility enables a manufacturer to sell some higher-emitting vehicle models as long as enough lower-emitting vehicle models are sold to achieve the applicable fleet-average emission standards for the particular vehicle type and model year. Generally, the fleet-average emission standards differ according to the vehicle type (e.g., PC, LDT1, LDT2) and weight class (e.g., 0-3,750 lb LVW, 3,750 lb LVW-8,500 lb GVWR) and are more stringent for each newer model year vehicle. MDVs are also provided a tier of emission standards, but instead of a fleet-average requirement, they must certify an increasing percentage of their MDVs to more stringent emission tiers. The different types of vehicles subject to LEV II include PC and LDT1, and LDT2 and the fleet-average emission standards are expressed in units of grams per mile (g/mi).

The emission standards under LEV II also account for the "durability basis" of each vehicle type to address the fact that vehicles tend to generate higher emissions as they age. For instance, a fleet of light-duty vehicles with a GVWR less than 8,501 lb was required to meet an intermediate full useful life standard during the first 50,000 miles of the vehicle's life and slightly less stringent full useful life standard before it reaches 120,000 miles. Manufacturers are also subject to in-use emission verification of their vehicles; those vehicles failing to meet the certified emission standards are subject to recall by the manufacturer for corrective action. Manufacturers are also required to warrant the performance of all emission control systems.

The emission standards of LEV II are sophisticated in a number of ways to meet two basic objectives. One objective is to establish standards that achieve the maximally feasible emission reductions based on the state of motor vehicle technologies at the time. The other objective is to maintain competitive parity among the different vehicle manufacturers while allowing them to be responsive to market demands. For this reason, some of the requirements under LEV II are different for small-, intermediate- and large-volume manufacturers. Compliance with LEV II also involves different tiers of vehicle emissions performance, including LEVs, Ultra-Low-Emission Vehicles (ULEVs), and Super-Ultra-Low-Emission Vehicles (SULEVs). In complying with LEV II, each manufacturer earns emission credits if it over-complies with the fleet-average standards and emission debits if it fails to meet the fleet-average standard. Any credits accrued by the manufacturer can be banked for future use, used to offset any debits accrued by the manufacturer, or sold to another manufacturer. If a manufacturer has not earned sufficient credits to offset any accrued debits, it may purchase credits, if available from another willing manufacturer, or be subject to fiscal penalties.

The emission standards that apply to model year 2010 also apply to all subsequent newer model years, and therefore, are in effect at the time of writing this EA. All emission standards were and are equivalent to, or more stringent than, comparable emission standards established by U.S. EPA.

ii. Greenhouse Gases

In 2005, requirements to reduce GHG emissions from all PCs, LDTs, and medium-duty passenger vehicles (MDPVs) were incorporated into the LEV II regulation. These additional requirements, generally known as the Pavley regulations (AB 1493), apply to model years 2009-2016 and, thus, continue to be phased in at the time of writing this EA. These are also fleet-average standards and are expressed in units of g/mi of carbon dioxide equivalent (CO_2e). Expressing emissions in CO_2e takes the contributions of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent, recognizing the varying global warming potential (GWP) of different GHGs. . The specific GHG emission standards incorporated into LEV II are found in CCR, Title 13, Section 1961.1.

The Pavley regulations takes into consideration that AC refrigerant leakage (i.e., direct emissions) and fuel use to power AC system usage (i.e., indirect emissions) increase GHG emissions. The rule provides credits as incentives to improve the leak-tightness and efficiency of AC systems.

Direct emissions of refrigerant contribute substantially to GHG emissions because of the high GWP of the refrigerant. The predominant refrigerant currently in use, hydrofluorocarbon-134a (HFC-134a, also referred to as R-134a, 1,1,1,2-tetrafluoroethane), is a potent GHG with a GWP of 1,430 (IPCC 2007b) (i.e., 1430 times as heat-trapping by weight as CO_2). It can slowly leak out of the AC system in a manner that may occur in any closed high-pressure system, such as permeation through hoses and seepage through fittings, connections, and seals. Larger loss may occur during accidents, maintenance and servicing, and vehicle disposal at the end of

useful life. The Pavley regulations grant direct AC credit of up to 6 g/mi of CO_2e, if the manufacturer can demonstrate that the AC system meets a suite of low-leak requirements. These requirements include use of fitting technologies less prone to leakage and misassembling, low permeability hoses, and multiple lips to seal the shaft for a belt-driven compressor. A greater credit of up to 9 g/mi of CO_2e can be granted, if the AC is manufactured to use an alternative refrigerant with a low GWP.

Indirect emissions occur because use of an AC system in a vehicle adds a load to the engine, resulting in increased tailpipe emissions or, in the case of plug-in electric vehicles, decreased all-electric range. The Pavley regulations grant indirect AC credits of up to 9 g/mi of CO_2e for systems with single-evaporator configuration and up to 11 g/mi of CO_2e for systems with a dual-evaporator configuration, if the manufacturer can demonstrate that the AC system meets specific efficiency requirements. To receive credits the AC system must have management of outside and recirculated air; be optimized for efficiency by utilizing state-of-the-art, high efficiency evaporators, condensers, and other components; and have an externally controlled compressor that adjusts evaporative temperature to minimize the necessity of reheating cold air to satisfy occupant comfort. If all of these criteria are met, manufacturers are awarded credits that are prorated based on the size of the compressor.

The Pavley regulations also provides credits for the sale of alternatively fueled (e.g., E85) vehicles to the extent shown to be running on that fuel.

The GHG requirements under the LEV regulation also form the basis for federal GHG requirements for model years 2012-2016, which were finalized by U.S. EPA and the National Highway Traffic Safety Administration (NHTSA) in April, 2010 (75 Fed. Reg. 25324 [May 7, 2010]).

U.S. EPA similarly provides indirect AC credits in its rule for model years 2012-2016, although the maximum number of credits is 5.7 g/mi due to a different methodology used to calculate indirect emissions. Because federal GHG requirements are substantially equivalent to the GHG reductions beyond those expected from the original Pavley regulations, California has agreed to allow compliance with the federal regulation for model years 2012-2016 to be deemed compliance with the Pavley regulations (CCR, Title 13, Section 1961.1[a]). This, in turn, allows vehicle manufacturers to meet a single set of national GHG standards while achieving the reductions envisioned by the Pavley regulations. A broader discussion about the nexus between ARB's efforts and those of federal agencies is discussed later in this chapter.

iii. California Evaporative Emission Regulations

Evaporative emissions consist of fuel hydrocarbon vapors from a motor vehicle that are released into the atmosphere. Evaporative emissions are classified into three types: running loss, hot soak, and diurnal. Running loss emissions occur during vehicle operation, originating from various sources within the fuel system and from fuel vapor overflow of the on-board carbon canister. Hot soak emissions occur immediately after the termination of engine operation, when latent engine heat vaporizes residual fuel in

the engine system. Diurnal emissions are caused by daily cycling of ambient temperatures when a vehicle is parked, where ambient temperature increases result in fuel tank vapor generation. Another type of emissions, refueling emissions, occurs during refueling of the vehicle when the entering liquid fuel volumetrically displaces the fuel vapors in the fuel tank.

One main source of vehicular evaporative emissions is the carbon canister, where excess vapors in the fuel tank are routed for storage instead of being released into the atmosphere. In many evaporative emission systems, the canister also captures fuel tank vapor emissions during refueling as part of onboard refueling vapor recovery (ORVR.) The carbon canister is regenerated during vehicle operation when the fuel vapors stored in the canister are purged into the engine's intake system and subsequently burned in the combustion process. Substantial evaporative emission losses from the canister occur when the generated fuel tank vapors routed to the canister are greater than its storage capacity, and thus, breakthrough of vapors from the canister occurs. In addition, small evaporative losses from the canister, called bleed emissions, result when hydrocarbon emissions escape the canister because of diffusion of adsorbed hydrocarbons as the vehicle rests over a period of time. Another main source of evaporative emissions is through permeation of fuel in elastomeric hoses, joints, and valves, as well as plastic fuel tanks.

Compliance with the current evaporative emission regulations, adopted as part of the LEV II Program, is based on meeting three separate certifications related to whole-vehicle emission standards. Specifically, these include the running loss emission standard, the three-day diurnal plus high-temperature hot soak (three-day) emission standard, and the two-day diurnal plus moderate-temperature hot soak (two-day) emission standard. The running loss emission standard ensures evaporative emission control during vehicle driving. The three-day emission standard ensures that the evaporative system can control evaporative emissions for three consecutive hot summer days. The two-day emission standard ensures an effective purging strategy of the vehicle carbon canister.

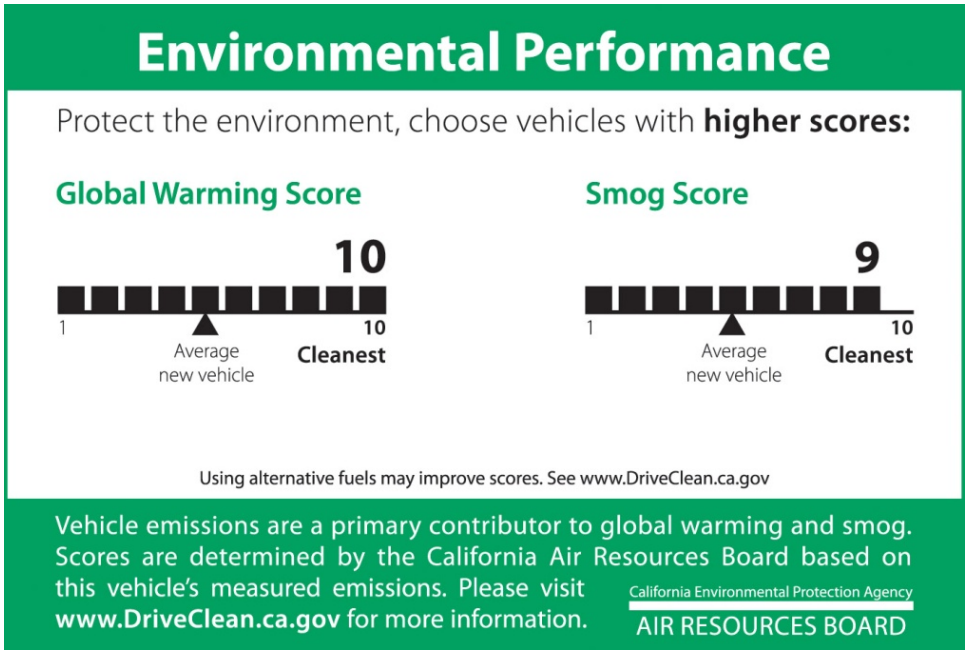
iv. Manufacturer Size Definition Changes

A manufacturer's California sales volume plays an important role in determining a manufacturer's treatment under various light-duty vehicle regulations. Size is based on a manufacturer's average PC, LDT, and MDV sales in California, and on the percentage amount that one manufacturer owns of another manufacturer. Two changes that affect the size definitions of manufacturers include: 1) staff proposes to decrease the intermediate volume manufacturer (IVM) (i.e., large volume manufacturer [LVM] threshold from 60,000 PCs, LDTs, and MDVs on average in California to 20,000 on average), and 2) staff proposes that two manufacturers' sales will be aggregated for determination of size if one manufacturer owns greater than 33.4 percent of another manufacturer. The effect of these changes is all current IVMs, except Volvo, Subaru, Jaguar/Land Rover and Mitsubishi, would be expected to become LVMs in 2018, and meet the full ZEV requirements starting that year. This proposed change is needed to assure that major manufacturers compete on a level playing field.

v. Environmental Performance Label Regulation

The EPL is a vehicle label showing the model's rating for GHG emissions (Global Warming Score) and CAP emissions (Smog Score). It is currently required on all new vehicles manufactured after January 1, 2009 and sold in California. The EPL is the result of AB 1229 (Nation), Statutes of 2005, and EPL requirements are found in CCR, Title 13, Section 1965. The EPL's appearance is shown in Figure 1-1.

Figure 1-1. Environmental Performance Label



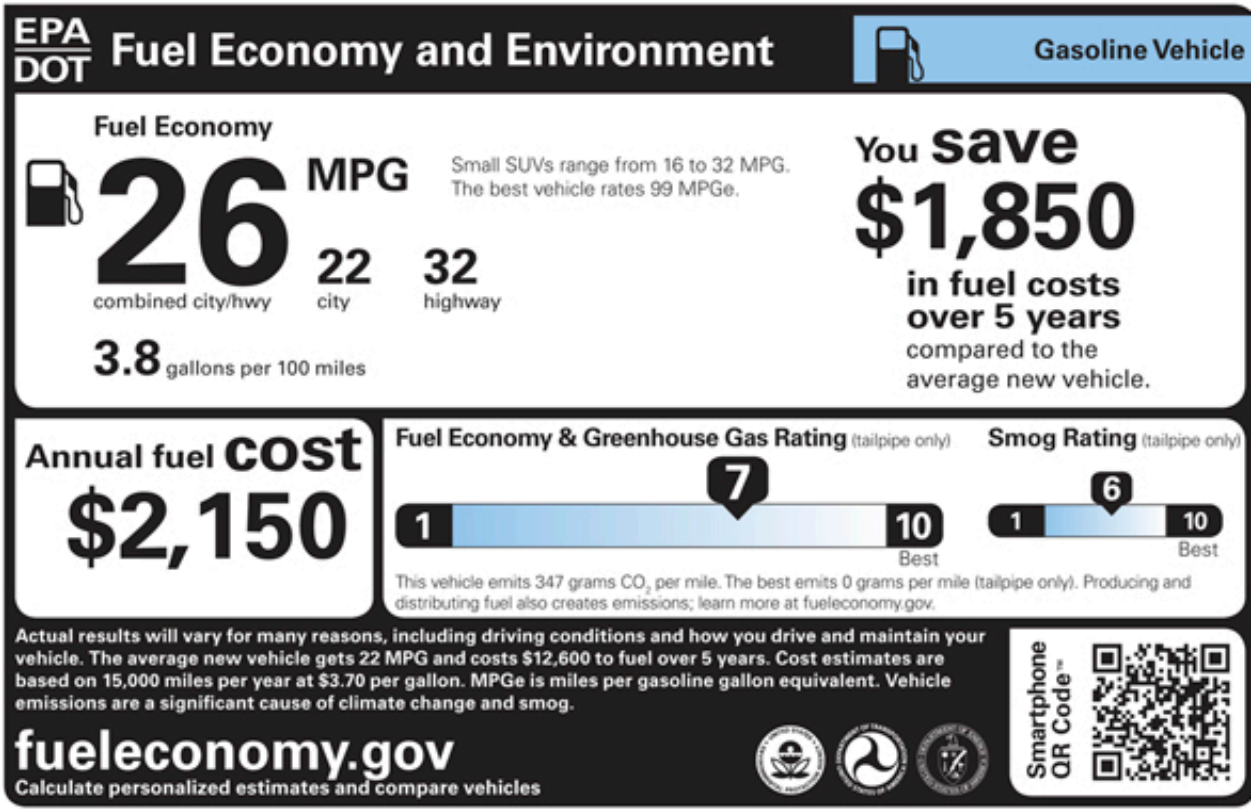
Source: ARB 2011a.

Since 1978, California's Smog Index Label has helped consumers assess the relative smog emissions from new cars. The current EPL regulation requires that both a Smog Score and Global Warming Score be posted on all new cars sold in California. The Smog Score is a simple rating that helps customers understand the level of CAP emissions generated by each particular vehicle model. The Global Warming Score provides a simple way for customers to understand the levels of GHGs emitted by each vehicle model. Both scores are based on a scale of 1 -10 with 10 being the cleanest and 5 representing the score for the average new light- or medium-duty vehicle.

In May 2011, U.S. EPA and NHTSA finalized a new Fuel Economy and Environment Label that is required on all new cars starting with model year 2013. However, the use of this new label is allowed earlier on a voluntary basis. The new Federal Fuel Economy and Environment Label is a redesign of the current fuel economy label found on all vehicles and will now include a Greenhouse Gas and Fuel Economy Rating that ranges from 1 to 10 with 10 being best and a Smog Rating, also from 1 to 10 with 10 being cleanest. The label's graphical representations are similar to and patterned on

the Global Warming and Smog Scores on California's EPL shown above. The Fuel Economy and Environment Label is shown in Figure 1-2.

Figure 1-2. Fuel Economy and Environmental Label



Source: DOT and U.S. EPA 2011.

Details about the specific amendments proposed to EPL are presented in Chapter III (Project Description) Section A.1.d.

vi. On-Board Diagnostic System Requirement

Second generation on-board diagnostics (OBD II) systems, which have been required on all 1996 and newer vehicles, consist mainly of software designed into the vehicle's on-board computer to detect emission control system malfunctions as they occur by monitoring virtually every component and system that can cause an increase in emissions. When an emission-related malfunction is detected, the OBD II system alerts the vehicle owner by illuminating a warning light on the instrument panel. By alerting the owner of malfunctions as they occur, repairs can be sought promptly, which results in fewer emissions from the vehicle. Additionally, the OBD II system stores important information including identification of the faulty component or system and the nature of the fault, which would allow for quick diagnosis and proper repair of the problem by technicians. This helps owners achieve less expensive repairs and promotes repairs done correctly the first time.

Since originally adopted in 1989, the regulation has been updated regularly, with the last major update to the regulation occurring in 2006, as well as updates to the medium-duty diesel requirements occurring in 2009. Staff was not scheduled to go to the Board this year to update the OBD II regulation; however, manufacturers recently approached ARB staff and requested regulation changes that they indicated were needed immediately to ensure compliance when they certify their 2013 model year vehicles. Interested manufacturers and ARB staff held discussions about the proposal,, including a meeting on July 27, 2011. In response to the manufacturers' requests, staff is proposing changes to the OBD II regulation, CCR, Title 13, Section 1968.2. The proposed amendments to the OBD II regulation consist of relaxation of a few requirements (e.g., delays to the required start dates) and clarifications.

vii E-10 Certification Fuel

The California certification fuel used for testing exhaust and evaporative emissions on passenger cars, light-duty trucks, and medium-duty vehicles currently contains the oxygenate methyl tertiary butyl ether (MTBE) in the quantity of 10.8 to 11.2 volume percent (equivalent to 2.0 percent by weight). MTBE was banned for use in California gasoline starting December 31, 2003. As a result of the ban of MTBE, ethanol became the prevalent oxygenate used in California gasoline. After the ban, refiners began adding approximately 5.7 volume percent ethanol to gasoline, which is equivalent to 2.0 weight percent. California gasoline contained 5.7 percent ethanol until the end of 2009. In 2010, California refiners transitioned to producing gasoline containing 10 percent by volume ethanol (E10).

As part of the proposed ACC program, staff is proposing to amend certification test fuel specifications by eliminating requited testing with MTBE and requiring 10 percent ethanol by volume instead, as discussed in Section 5 of the Project Description. This proposed modification would better align the specifications of certification test fuel with the properties of in-use fuel. For evaporative emission testing, phase-in of the ethanol-containing certification test fuel is proposed to occur at the same model year percentages being proposed for the LEV III FTP 150,000-mile durability requirements applicable to the light-duty fleet.

b. Zero Emission Vehicle Regulation (ZEV)

ARB first adopted the ZEV requirement in 1990 as part of the LEV regulation discussed above and has since modified the ZEV regulation several times. The ZEV mandate provides more reasonable assurance that ZEVs will be produced in high enough volumes to provide a launch of the technology in the marketplace. The regulation includes specific regulatory mechanisms to reduce the risk of early ZEV market failure.

Under the existing ZEV regulation, manufacturers are required to produce a number of ZEV and ZEV-enabling technologies each year. The types of technologies manufacturers produce to comply with the regulation are listed in Table 1-2.

Table 1-2. Zero Emission Vehicle Types and Technologies

Vehicle Type	Technical Description	Credit Amount	Vehicle Examples
ZEV	Zero tailpipe emissions (i.e., no tailpipe): battery electric vehicles (BEV), and hydrogen fuel cell vehicles (FCV).	1.0 - 7.0	Nissan Leaf, Honda FCX Clarity
Transitional Zero Emission Vehicles (TZEV)	Vehicles certified to PZEV standards that also run on ZEV fuels for at least 10 miles (e.g. plug-in hybrid electric vehicles or hydrogen internal combustion engine vehicle)	1.0 - 2.5	GM Volt
Advanced Technology Partial Zero Emission Vehicle(AT PZEV)	Vehicles certified to PZEV standards and employing ZEV-enabling technologies (e.g. hybrids or compressed natural gas vehicles)	0.5 – 0.7	Toyota Prius
Partial Zero Emission Vehicle (PZEV)	Conventional gasoline vehicles certified to the most stringent tailpipe emission standards, zero evaporative emissions, and extended warranty.	0.2	Ford Focus PZEV

The ZEV regulation is based on a credit mechanism that affords manufacturers flexibility to produce various types of vehicle technologies. Credits are given to vehicles based on zero emission range, refueling capabilities, hybridization, and emissions performance. The credit amounts are also summarized in Table 1-2.

The vehicle types that earn credits to comply with the ZEV regulation also help manufacturers attain the fleet-average emission standards established by the existing LEV regulation (and the proposed LEV III regulation).

ZEV requirements are included in CCR, Title 13, Section 1962.1. Details about the specific amendments proposed to the ZEV regulation are presented in Chapter III (Project Description).

c. Clean Fuels Outlet Regulation (CFO)

The CFO regulation was originally developed in 1990 to apply to all alternative fuel vehicles (AFVs) that, when operated on a designated clean fuel, would achieve LEV emission standards. Types of designated clean fuels include natural gas, ethanol, methanol, and hydrogen. Electricity is specifically excluded from the definition of a designated clean fuel because of its non-liquid form and unique distribution and market characteristics that are unlike other fuels under this regulation. In essence, once the

projected numbers of AFVs that use a specific clean fuel reach 20,000, the larger owner/lessors of gasoline retail outlets, i.e., gas stations, would be required to equip a specified number of their outlets with that alternative fuel. When the CFO regulation was written, it was projected that AFVs would be needed in the State's vehicle fleet to meet CAP emission standards; however, the need for AFVs to enter the fleet was negated by the innovation and introduction of cleaner-burning fuels and more advanced emission control technologies for conventional fuel vehicles (i.e., gasoline and diesel) that met LEV II standards.

During development of the original CFO regulation, ARB projected that most early AFVs would be flex or dual-fueled vehicles that could also operate on gasoline and this projection was confirmed by manufacturers' response. This assumption served as the basis for setting the initial trigger at 20,000 AFVs. Market-based analyses were used to determine that fuel providers could feasibly produce and sell alternative fuels at this market volume. California surpassed the 20,000 AFV trigger level for E-85 flex-fuel vehicles in mid-2000, but due in part to concerns over life-cycle emissions from substantially increased ethanol production and distribution, the regulation was never activated. Today, the use of ethanol-gasoline blends is promoted through the federal Renewable Fuels Standard (RFS), which applies to liquid fuels only, and California's Low Carbon Fuel Standard (LCFS). RFS and LCFS both place the responsibility on oil companies and fuel distributors to increase the amount of biofuels and other low-carbon fuels dispensed for transportation.

Thus, the CFO regulation compliments the ZEV regulation, because it ensures the availability of alternative fuels as AFVs are produced and sold in California.

The CFO regulation is included in CCR, Title 13, Sections 2300-2318. Details about the proposed version of the CFO regulation are presented in Chapter III (Project Description).

2. ARB Nexus with the U.S. Environmental Protection Agency and National Highway Traffic Safety Administration

There are currently no comparable federal CAP emission standards for 2015 and subsequent model passenger vehicles as stringent as this proposed California rule. However, U.S. EPA has indicated that it expects to issue a Notice of Proposed Rulemaking (NPRM) for their "Tier 3" next generation of CAP emission standards in January 2012, which will apply to 2017 and subsequent model year vehicles. Staff expects the Tier 3 program to be comparable to the California proposed rule in the applicable timeframe. This national rule is expected to be finalized in late-2012.

With regard to GHGs, U.S. EPA and NHTSA have been working together under the federal Clean Air Act and the Energy Independence and Security Act of 2007 to develop a coordinated national program of harmonized regulations to reduce emissions and improve fuel efficiency. The agencies issued a Final Rulemaking establishing standards for 2012-2016 model year vehicles on April 1, 2010 (U.S. EPA 2010c).

The federal agencies are now developing a rulemaking to set standards for model year 2017-2025 PC and LDT (U.S. EPA 2011a), which is consistent with the Presidential Memorandum regarding fuel efficiency standards (The White House Office of the Press Secretary 2010).

There are currently no comparable federal GHG emission standards that are as stringent as the proposed standards for 2017 and subsequent model passenger vehicles. (The current federal GHG emission standards for the 2016 and subsequent model years are comparable to those applicable in California in the 2016 model year). However, on November 16, 2011, an NPRM was issued by U.S. EPA and NHTSA for a joint rulemaking that proposes a coordinated federal GHG emission reduction and fuel economy program for light-duty vehicles, beginning in the 2017 model year. This national rule is expected to be finalized by the end of July 2012. There are no significant differences between the proposed California GHG regulations and those presented in the NPRM. Furthermore, staff does not expect there to be any significant differences between the proposed California GHG regulations and those in U.S. EPA's Final Rule.

D. ACC Program Objectives

Recognizing the need to attain national and State ambient air quality standards for CAPs, as well as the requirements of AB 1493 and AB 32 and the role of clean car standards in contributing to GHG emission reductions, the following project objectives are presented for the proposed ACC Program:

1. ***Ensure all Californians can live, work, and play in a healthful environment free from harmful exposure to air pollution*** – to protect and preserve public health and well-being, and prevent irritation to the senses, interference with visibility, and damage to vegetation and property (Health and Safety Code [HSC], 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 (HSC, Section 43000[a]);

2. ***Achieve the maximum emissions reduction possible from motor vehicles*** – to attain the national and State ambient air quality standards for CAPs (HSC, Sections 43000.5[b] and 43018[a]);

3. ***Establish a uniform set of vehicle emission standards*** – to provide clarity to vehicle manufacturers about the emission-related requirements by integrating them into a single, coordinated package (HSC, Section 43000[c]);

4. ***Reduce dependence on petroleum as an energy resource*** – to reduce the State's reliance on petroleum and support the use of diversified fuels in the State's passenger vehicle fleet. 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, Sections 25000.5[b] and [c]);

5. ***Decrease GHG emissions in support of statewide GHG reduction goals*** – to adopt "clean car standards," as identified in the Scoping Plan, which was developed for the purpose of reducing GHG emissions in California, as directed by AB 32, Statutes of 2006. As described in the Scoping Plan recommendations, "these types of compliance options will be key in ensuring that we are able to meet our reduction targets in a cost-effective manner" and "will play a central role in helping California meet its 2020 reduction requirements" and "figure prominently in California's efforts beyond 2020." More specifically, ARB has determined that the proposed ACC Program would need to achieve a reduction of at least 3.8 MMT CO_2e, as described in the Scoping Plan. Implementation of the proposed ACC Program would also provide further GHG reductions pursuant to AB 1493 (Pavley regulations) (Chap. 200, Statutes of 2002). Finally, implementation of the proposed ACC Program would also be a key measure to help California reduce GHGs to 80 percent below 1990 levels by 2050 to further reduce the threat of climate change, which is a goal identified in former Governor Schwarzenegger's Executive Order S-3-05 to minimize climate change impacts and achieve climate stabilization;

6. ***Ensure emission reductions*** – to ensure that emission reductions are real, permanent, quantifiable, verifiable and enforceable, as identified in the Scoping Plan (HSC, Section 38562[d]);

7. ***Improved automotive technologies and fueling infrastructure*** – to guide the acceleration of the development of environmentally superior passenger vehicles that will continue to deliver performance, utility, and safety demanded by the market, and to promote an infrastructure that is supportive of AFVs; and

8. ***Spur economic activity*** – to incentivize innovation that will transition California's economy into greater use of clean and sustainable technologies and to promote increased economic and employment benefits that will accompany this transition (AB 1493 Section 1[g]; HSC, Section 38501[e]).

E. 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. The environmental analysis for broad programs cannot be as detailed as for specific projects (CCR, Title 14, Section 15146). For example, the assessment of a construction project would naturally be more detailed than for the adoption of a plan, because the construction effects can be predicted with a greater degree of accuracy (CCR, Section 15146 [a]). This analysis addresses a broad regulatory program, affecting statewide sales of millions of new

passenger vehicles, from between six and 14 years from now, so a general level of detail is appropriate. The EA provides a good-faith effort to evaluate significant adverse impacts and beneficial impacts of the regulatory program and contains as much information as is currently available, without being speculative.

The scope of analysis in this environmental analysis is intended to help focus public review and to encourage that questions and comments are appropriate and meaningful. This analysis specifically focuses on potential significant, adverse and beneficial impacts on the physical environment resulting from compliance responses to the proposed changes to the existing State regulations regarding emissions from new light- and medium-duty vehicles sold in California, and from actions and infrastructure necessary to provide alternative vehicle fuels.

The analysis of potential significant, adverse environmental impacts from the proposed ACC Program is based on the following assumptions:

1. This analysis addresses the potential significant, adverse environmental impacts resulting from implementing the regulatory amendments of the proposed ACC Program compared to the existing regulations concerning emissions standards for light- and medium-duty vehicles, the availability of alternative fuels, and other applicable existing regulations.

2. The environmental baseline is defined by existing vehicle and related fuel emissions programs, policies, and regulations. The existing regulatory condition includes the existing LEV regulation (LEV II), including the GHG requirements that are part of LEV II (known as the Pavley regulations), the EPL regulation, and the existing ZEV regulation, as well as other relevant, previous California rulemakings, such as the LCFS and all comparable federal regulations.

3. The analysis of environmental impacts and determinations of significance are based on a comparison of the reasonably foreseeable methods of compliance related to the proposed amendments under the ACC Program with the current methods of compliance related to the existing State and federal regulatory framework.

4. The analysis in this EA addresses environmental impacts both within the State of California and outside the State to the extent they are reasonably foreseeable and do not require speculation.

5. The level of detail of impact analysis is necessarily and appropriately general, because the nature of the proposed ACC Program is programmatic and specific infrastructure and facility development projects will not occur solely from approval of this program. Specific projects implementing the proposed ACC Program will undergo their normally required environmental review and compliance processes. In addition, performance standards generally, and the proposed fleetwide CAPs and GHG emissions standards in the LEV III program in

particular, allow a wide variation in compliance responses, which will vary even further by manufacturer due to their differing baseline fleet characteristics that the analysis must necessarily project four to five model years into the future.

6. Because of the statewide reach of the proposed ACC Program and the longer-term future horizon of the achievement of a statewide fleet that is lower in both CAP and GHG emissions, the programmatic impact analysis applies generally across a broad geography, rather than at site- or project-specific locations. However, impact analyses do examine regional (e.g., air basin) and local issues, where feasible and appropriate. As a result, the character of the impact conclusions in the resource-oriented sections of Chapter 5, Impact Analysis and Mitigation, are generally cumulative, considering the potential effects of the full range of reasonably foreseeable methods of compliance, along with expected background growth in California and the U.S., as appropriate. Chapter 8 provides a summary of potential cumulative impacts of the proposed ACC Program in conjunction with other reasonably foreseeable future air quality programs (see "complementary measures" discussion below).

1. Environmental Checklist

An environmental checklist was used to identify and evaluate potential impacts of the proposed ACC Program as contained in Attachment 1. Further discussion is presented in Chapter 5, Impact Analysis, regarding the impacts of the proposed ACC Program, and potential mitigation strategies that can be implemented to lessen any identified potential significant adverse impacts.

2. Basis for Environmental Impact Analysis and Significance Determinations

The policy and direction of the existing LEV II (including the Pavley regulations that address GHG standards), ZEV, and CFO regulations established by previous rulemakings define the current requirements for compliance with emission standards for passenger vehicles in California. In addition, it is important to note that other existing measures are in place to reduce GHGs, as described in the Scoping Plan, to the extent they have been Board-adopted. These are called "reference measures" because they are already in effect and because they help define the existing baseline of GHG emissions in California.

CEQA requires that the baseline for determining the significance of environmental impacts is normally the existing physical conditions at the time the environmental review is initiated (CEQA Guidelines, CCR, Title 14, Section 15125[a]). Therefore, the significance determinations reflected in the EA are based on changes from existing physical conditions, in keeping with CEQA requirements.

In the context of regulatory programs, impacts on the physical environment are the result of compliance responses to regulations. Compliance responses to the existing

LEV II, ZEV, and CFO regulations are already in place and underway. The environmental effects of proposed amendments to regulations that reduce CAP and/or GHG emissions from light- and medium-duty vehicles would build upon the compliance responses to these existing regulations. Approval and implementation of the proposed ACC Program would result in the amendment of existing emission requirements and alternative fuel availability requirements for light- and medium-duty vehicles to a more stringent set of standards and requirements; in response, compliance methods would also change. Comparison of reasonably foreseeable methods of compliance in response to the proposed regulatory amendments with the current and likely compliance responses to the existing standards and requirements and other reference measures is the approach used to estimate the potential environmental effects attributable to the proposed ACC Program. That is, the approach compares one set of projections (2017 – 2025) with compliance responses as of 2016.

Other reasonably foreseeable actions are approved or proposed to take place in the time frame of the proposed ACC Program, but are not yet in effect. These are referred to as "complementary measures" (e.g., Environmental Standards for Hydrogen Production [requires GHG reductions and use of renewables in accordance with SB 1505]). They help define the future, cumulative scenario of reasonably foreseeable compliance measures. The complementary measures are designed to reduce CAPs and GHGs by increasing the efficiency with which California uses all forms of energy and by reducing dependence on the fossil fuels.

a. Adverse Environmental Impacts

The analysis of adverse effects on the environment and significance determinations for those effects in the EA reflect the programmatic nature of the analysis of the reasonably foreseeable methods of compliance by vehicle manufacturers, hydrogen fuel producers, fuel retailers, and battery recyclers, as well as consumers. These compliance responses are described in greater detail in Chapter 4. Thus, the EA analysis addresses broadly defined types of impacts without the ability to determine the specific project or vehicle locations, facility size and character, or site-specific environmental characteristics affected by the facilities. Environmental impacts may be determined to be potentially significant, because of the inherent uncertainties about the relationship between future infrastructure and vehicle design and environmentally sensitive resources or conditions. This is a conservative approach (i.e., tending to overstate environmental impacts), in light of these uncertainties, to satisfy the good-faith, full-disclosure intent of CEQA. When specific projects are proposed and subjected to project-level environmental review, it is expected that many of the impacts recognized as potentially significant in this EA and not already mitigated or avoided with this proposed Board approval can later be avoided or reduced to a less-than-significant level.

Another inherent uncertainty in the EA analysis is the degree of implementation of mitigation for potentially significant impacts. While ARB is responsible for adopting the regulatory amendments that comprise the proposed ACC Program, it does not have authority over the proposal, approval, or implementation of infrastructure and

development projects. Also, because the vehicle standards are nearly all performance-based and not prescriptive, the ACC program is generally not mandating any particular technology(ies) on any particular vehicles. ARB also has no control over which vehicles or with which technology(ies) would be purchased and operated in which areas of the State. Other agencies are responsible for the environmental analyses of proposed facilities and infrastructure (e.g., alternative fueling stations, manufacturing facilities, and battery recycling outlets), definition and adoption of project-specific feasible mitigation, and monitoring of mitigation implementation. For example, local cities or counties must approve proposals to construct fueling stations. 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 ARB is not responsible for implementation of specific infrastructure projects (such as fueling stations), the programmatic analysis does not allow for a precise description of the details of project-specific mitigation. As a result, there is inherent uncertainty in the degree of mitigation ultimately implemented to reduce the potentially significant impacts. Consequently, the 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) and discloses, for CEQA compliance purposes, that potentially significant environmental impacts may be unavoidable, where appropriate. It is expected that facility and infrastructure projects would be able to feasibly avoid or mitigate to a less-than-significant level many of these potentially significant impacts as an outcome of their project-specific environmental review processes.

b. Beneficial Effects to the Environment

Where applicable, this EA also acknowledges various beneficial effects in each resource area that may result from ARB's adoption and implementation of the proposed ACC Program, consistent with ARB's Certified Regulatory Program requirements (CCR, Title 17, Section 60005[b]).

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2.0 PROJECT DESCRIPTION

The proposed Advanced Clean Cars (ACC) Program consists of amendments to existing regulations to provide a comprehensive approach to further reduce emissions of criteria air pollutants and precursors (CAPs) and greenhouse gases (GHGs) from light- and medium-duty vehicles in California. Toxic air contaminants (TACs) generally decrease in tandem with these. Accordingly, the proposed ACC Program would include more stringent emission standards for CAPs and GHGs, requirements for vehicle manufacturers to increase the proportion of zero emission vehicles (ZEVs) (e.g., hydrogen fuel cell vehicles [FCVs], battery electric vehicles [BEVs] sold in California), requirements for increased availability of alternative fuel stations to support the resultant increase in ZEVs, and changes to the types of emissions information that must be posted on new cars. The major components of the proposed ACC Program are discussed in greater detail below. As discussed further in Section E of this chapter, for CEQA purposes the "project" is the collective set of proposed regulatory amendments that would affect manufacturer design of vehicles and the fueling of a segment thereof to meet these ARB regulations, while also meeting other regulatory requirements.

A. Amendments to the Low-Emission Vehicle and Greenhouse Gas Regulation (LEV III)

The proposed amendments to the Low-Emission Vehicle and Greenhouse Gas regulation (LEV III) would revise and update the standards currently in place under LEV II, which was summarized earlier in Chapter 1. LEV III would consist of a set of more stringent emission standards for the various light- and medium-duty vehicle classes and more stringent fleet average emission standards starting with model year 2015 and becoming more stringent through model year 2025. Like the existing LEV II regulation, LEV III would continue to address exhaust emissions of formaldehyde, non-methane organic gas (NMOG), carbon monoxide (CO), oxides of nitrogen (NO_X), particulate matter, and evaporative emissions of hydrocarbons (HC). In addition to establishing emission standards that are more stringent than current requirements, LEV III would also generally include the following changes regarding CAPs:

- LEV III would replace the separate standards for NMOG and NO_X with a combined standard that is based on the sum of these two pollutants.

- LEV III also would increase the "durability basis" from 120,000 miles to 150,000 miles. The extended durability basis would ensure the effectiveness of a vehicle's emissions control systems over the assumed operational life of the vehicle.

- LEV III would extend applicability of the California Supplemental Federal Test Procedure (SFTP) to medium-duty and alternative-fueled vehicles, and include two options for complying with the SFTP. The SFTP is designed to specifically address off-cycle emissions, which are those not normally accounted for in on-

road driving cycles used for vehicle certification, resulting from aggressive operation, typified by high speeds and hard accelerations, and from air conditioner use. LEV III would also extend SFTP applicability throughout the full useful life of affected vehicles. SFTP II would also require standards for controlling exhaust emissions of particulate matter during off-cycle driving.

- LEV III would extend the zero fuel evaporative emissions standards to all vehicles subject to evaporative emission requirements and provide two options by which manufacturers could comply with these standards. The evaporative emissions standards would be fully phased in by model year 2022.

- The proposed LEV III regulation would also include more stringent standards for GHG emissions from light-duty vehicles for model years 2017-2025. As part of this proposal, ARB is working with the U.S. Environmental Protection Agency (U.S. EPA) and the National Highway Traffic Safety Administration (NHTSA) in their development of a national regulation that would require reductions in vehicle GHG emissions and consequent improvements in fuel efficiency that would also serve California's needs to reduce GHG emissions.

As part of LEV III, ARB proposes to continue awarding credits to manufacturers that utilize air conditioning (AC) system technologies that reduce direct emissions (from refrigerant leakage) and indirect emissions (from usage), but amend the credit formulas used as part of California's 2009-2016 model years-GHG standards (i.e., Pavley regulations) so that they align with U.S. EPA's methodology for 2017-2025 model years. Rather than specifying the suite of technologies that must be used by the manufacturer to receive credits, as currently required by the Pavley regulations, ARB proposes to adopt U.S. EPA's approach to award credits based on the individual technologies employed. Thus, direct credit would be given for the reduction of direct refrigerant emissions achieved through improvement of refrigerant containment and/or use of a refrigerant with a global warming potential (GWP) less than or equal to 150. Indirect credit would be given for the reduction of indirect emissions achieved through use of efficiency improvement technologies listed on a menu; however, the total credit would be capped to account for synergistic effects of the various efficiency improvement technologies for AC systems.

Overall, the goal of the proposed LEV III regulation is to make the emissions requirements for light- and medium duty vehicles sold in California generally consistent with requirements of the Tier 3 emission standards proposed by U.S. EPA, and consistent with the federal GHG standards and consequent fuel efficiency standards for motor vehicles.

1. Amendments to the California Evaporative Emission Regulations

To maintain continuity of vehicles certified to the zero evaporative emission standards and to expand the use of existing zero evaporative technology to the remaining vehicle classes, staff proposes to require new passenger cars, light-duty trucks, medium-duty

vehicles, and heavy-duty vehicles that are gasoline-fueled, liquefied petroleum gas-fueled, and alcohol-fueled, to comply with the zero evaporative emission standards. This would require amending CCR, Title 13, Section 1976 and the incorporated "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles". The proposed lower evaporative emission standards are equivalent in stringency to the current optional LEV II zero evaporative emission standards.

2. Manufacturer Size Definition

To retain a level competitiveness, staff propose two changes to the size definitions of manufacturers:

1) Decrease the intermediate volume manufacturer (IVM) (i.e., large volume manufacturer [LVM] threshold from 60,000 PCs, LDTs, and MDVs on average in California to 20,000 on average); and

2) Aggregation of two manufacturers' sales for determination of size if one manufacturer owns greater than 33.4 percent of another manufacturer.

3. Amendments to the Environmental Performance Label

Some changes would also be made regarding the existing California Environmental Performance Label (EPL) regulation, which is described in Chapter 1, Section C.1.d. More specifically, compliance by manufacturers with the Federal Fuel Economy and Environment Label, as finalized in May 2011, would be deemed compliant with California EPL requirements. This would allow for one label depicting relative vehicle CAP and GHG emissions nationwide, incorporating both the substance and style of California's existing EPL.

4. Amendments to the On-Board Diagnostic System Requirements

The proposed amendments to the OBD II regulation would consist of relaxations to a few requirements (e.g., delays to the required start dates) and clarifications. The proposed relaxations would include the following:

- Delaying the start date for manufacturers to monitor the ability of a catalyst to generate a desired feedgas to promote better performance in a downstream after-treatment component (e.g., generate nitrogen dioxide for higher NOx conversion efficiency in a selective catalytic reduction [SCR] system) from the 2010 model year to the 2015 model year for light-duty vehicles and from the 2013 model year to the 2015 model year for medium-duty vehicles.

- Delaying the start date for manufacturers to monitor the non-methane hydrocarbon (NMHC) conversion capability of catalyzed particulate matter (PM) filters from the 2010 model year to the 2015 model year for light-duty vehicles and from the 2013 model year to the 2015 model year for medium-duty vehicles.

- Extending the allowance for a deficiency by an additional model year for manufacturers unable to meet the requirement to detect malfunctions of the PM filter when the filtering capability degrades to a level such that tailpipe emissions exceed the more stringent 2013 model year thresholds.

- Delaying the start date for manufacturers to monitor the tolerance compensation features of the fuel control system components on diesel vehicles from the 2013 model year to the 2015 model year.

While ARB staff believes all the requirements mentioned above are technically feasible for manufacturers to meet (and hence, are being delayed, not eliminated), circumstances, such as delays in technology development, have prevented manufacturers from implementing the requirements within the required deadlines (e.g., delay in the development of the PM sensor). Additionally, manufacturers have requested that ARB staff propose clarifications to a few requirements in the current OBD II regulations, including those that address hybrid vehicles. The OBD II requirements include software in the car computer that verifies if the diagnostics are running frequently enough. ARB staff is proposing to update these requirements to clarify how to track such data for hybrids and especially plug-in hybrid vehicles that can have all or some portion of driving trips where the engine emission controls are never even operated due to battery/electric vehicle operation. ARB staff has already discussed the proposed amendments with hybrid manufacturers and have come to an agreement regarding these changes, which would only consist of minor software revisions. Similar changes are also being proposed to account for the erasing of fault information in hybrids, which would also only also consist of minor software revisions.

5. Amendments to the Specifications for California Certification Fuel Regulation

Since MTBE was banned for use in California gasoline starting December 31, 2003, ethanol became the prevalent oxygenate used in California gasoline. California gasoline contained 5.7 percent ethanol until the end of 2009. In 2010, California refiners transitioned to producing gasoline containing 10 percent by volume ethanol. Currently, all gasoline in California contains 10 percent ethanol and will continue to contain 10 percent ethanol for the foreseeable future. While the type of oxygenate and oxygenate amount have changed in in-use California gasoline (i.e., fuel used by California consumers), the certification fuel used for emission testing has not, and is no longer representative of in-use fuel. The certification fuel in California is being updated to reflect the in-use fuel. Staff is proposing to amend existing regulations to require use of a certification fuel that contains 10 percent ethanol (E10 fuel). Staff is proposing that the E10 certification fuel to be required beginning 2014, and is also proposing that the E10 certification fuel would be available for optional use upon the Office of Administrative Law's filing of the LEV III rulemaking with the Secretary of State.

B. Amendments to the Zero Emission Vehicle Regulation (ZEV)

The proposed amendments to the ZEV regulation focus on technologies that help meet long-term CAP and GHG reduction goals, including having more battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs) in the statewide vehicle fleet, simplifying the ZEV regulation where needed, and increasing requirements for 2018 model year and beyond. A brief description of the current ZEV regulation is provided in Chapter 1 and the amount of ZEV credits that manufacturers currently earned by various vehicle classes is summarized in Table 1-2.

The proposed amendments are divided into two timeframes: model years 2012 through 2017, and 2018 and subsequent model years. For 2012 through 2017, limited amendments are proposed to allow manufacturers to indefinitely bank ZEV credits for use in later years, and to increase the number of credits earned by long-range (300 mile or more) fuel cell vehicles (FCVs).

For 2018 and subsequent model years, the ZEV requirements would be increased, so that by 2025, 15 percent of a manufacturer's new vehicle sales would be required to be ZEVs (e.g., BEVs and FCVs) and Transitional Zero Emission Vehicles (TZEVs) (e.g., PHEVs). In addition to increasing the requirement, the proposed amendments would modify the amount and calculation of credits for ZEVs and TZEVs. Manufacturer's size definition requirements would also be amended, so that 97 percent of manufacturers would be required to fully comply with the regulation. The amendments would also modify the "carry-back" provision, so that manufacturers would be allowed to carry a deficit in their required ZEV credits for only one year, before being subject to penalties. Overall, these amendments would result in a greater proportion of ZEVs in the statewide light- and medium duty vehicle fleet.

C. Amendments to the Clean Fuels Outlet Regulation (CFO)

As explained in Chapter 1, the Clean Fuels Outlets (CFO) regulation was initially developed and approved in 1990 and updated by the Board in 2000, but never activated. As part of the proposed ACC Program, ARB would amend the CFO regulation with updated requirements. The requirements would account for the types of alternatively fueled vehicle (AFV) technologies feasible at this time, particularly those that are most effective at reducing CAPs and GHGs.

With the proposed changes, the CFO regulation would apply only to fuels for ZEVs, specifically hydrogen FCVs, and it would not address natural gas-, ethanol-, or methanol-fueled vehicles like the previously drafted regulation. The CFO regulation would require major refiners and importers of gasoline, instead of owners/lessors of gasoline retail outlets, to build new hydrogen fueling stations based on the projected number of hydrogen FCVs operating in the State. More specifically, major refiners and importers would be required to build retail hydrogen fueling stations when projections indicate there would be 20,000 or more FCVs operating within the State. The amendments would add an additional trigger to build outlets of 10,000 vehicles that

would be applied within a specific air basin. Projections would be based on records provided by the Department of Motor Vehicles, and sale and lease forecasts from vehicle manufacturers.

Consistent with the current CFO regulation, the number of FCVs that are as part of an organization's fleet operation would be discounted by 75 percent before they are included in the total tally for the 10,000 and 20,000 trigger levels. This is because an organization operating an FCV fleet (e.g., a private company, government agency, or university campus) would be anticipated to have its own private hydrogen fueling station and would be less dependent on publicly available fueling stations. However, the regulation would provide for an adjustment to the fleet discount factor based on the availability of fuel for that fleet. The proposed regulation would also require vehicle manufacturers to provide ZEV production plans to ARB three years in advance (instead of two years) and to specify where vehicles would be deployed. These changes were designed to provide the refiners and importers with additional time to locate and build stations.

Once the trigger number of vehicles is reached, ARB would determine how many new fueling stations would be needed to support these vehicles, and then allocate the responsibility of establishing new stations among the major refiners and importers of gasoline based on their annual share of gasoline supplied to California. Once notified of their obligation, responsible parties would have approximately 2.5 years to meet their requirements. ARB would inform major refiners and importers of gasoline of the geographic areas where stations are needed to ensure that fueling stations would be constructed in locations that would be adequately accessible by the general public, but the major refiners and importers of gasoline would be responsible for identifying exact station locations. The protocol used to determine station locations would account for the need to provide adequate station coverage in the areas where FCVs are being marketed, leased, and sold. Requirements to build new hydrogen fueling stations would sunset when the number of hydrogen fueling stations statewide represents five percent of the total number of retail fuel outlets; however, major refiners and importers of gasoline would be required to continue operating and maintaining the hydrogen fueling stations that they previously built.

The regulation would also include additional requirements regarding BEVs and BEV-charging infrastructure. It would require ARB to assess the battery-charging infrastructure needs of BEVs within a specified period after the regulation is adopted. The purpose of ARB's assessment would be to determine where BEV drivers are charging their cars (e.g., at home, at workplaces, or at public charging locations), charging frequency, and under what conditions and locations would additional public charging stations be needed to adequately support BEV activity. Following its assessment, ARB would make recommendations regarding public battery-charging infrastructure.

The proposed amendments to the CFO regulation would complement the ZEV regulation, because they ensure the availability of hydrogen to FCVs as they are

produced and sold in California. The amended CFO regulation would also ensure vehicle manufacturers and consumers that FCV ownership is a real and viable option for passenger transportation in California. Finally, the amendments would require ARB staff to monitor BEV deployment in an effort to have battery-charging opportunities keep pace with needs.

D. The "Project" as Three Combined Regulatory Amendment Packages.

The "project," as defined by CEQA, undergoing environmental review in this EA is the combined set of amendments to the LEV, ZEV, and CFO regulations. The amendments to these three regulations are analyzed as one project, because the regulations are related and compliance responses by vehicle manufacturers and fuel providers would have a combined effect on the statewide vehicle fleet, the ways light- and medium-duty vehicles are sold and leased, and the availability and use of alternative fuels. This is necessary to provide a comprehensive review of the combined, or cumulative, effect of these regulatory amendments.

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3.0 ENVIRONMENTAL SETTING

Existing physical conditions and the current regulatory framework relevant to each environmental topic are presented in this section. Refer to Chapter 4 for the analysis of environmental impacts and description of mitigation measures, if needed.

A. Aesthetics

1. Existing Conditions

California, by virtue of its size, setting, and topographic and climatic 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.

Visibility is a factor that affects the ability to view and appreciate the aesthetic values in these features and settings and visibility is directly affected by the presence of airborne visibility-reducing particles. Visibility-reducing particles consist of suspended particulate matter, which is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These 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 (ARB 2009a).

2. Regulatory Setting

Applicable laws and regulations associated with aesthetics and scenic resources are discussed in Table 3.A-1.

Table 3.A-1. Applicable Laws and Regulations for Aesthetic Resources

Applicable Regulation	Description
Federal	
Federal Land Policy and Management Act of 1976 (FLPMA)	FLPMA is the enabling legislation establishing the Bureau of Land Management'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 resource, and archeological values …. " Section 103 (c) identifies "scenic values" as one of the resources for which public land should be managed.
Bureau of Land Management 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.
Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users	This Act includes numerous provisions for improvements and changes to the implementation of transportation enhancement activities, which are funded by a ten percent set aside of Surface Transportation Program funds that are earmarked for transportation enhancement projects. This Act includes a list of qualifying transportation enhancement activities which include several items supportive of visual

Table 3.A-1. Applicable Laws and Regulations for Aesthetic Resources	
Applicable Regulation	**Description**
	quality enhancement such as acquisition of scenic easements and scenic or historic sites, scenic or historic highway programs, landscaping or other scenic beautification, and control and removal of outdoor advertising, among others. Transportation enhancement activities are not required to have a direct link to surface transportation, and they are sufficiently qualified if they merely relate to surface transportation.
National 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." (36 CFR Part 800.5.)
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 ten miles or more (0.07 — 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. (Method: Beta Attenuation and Transmittance through Filter Tape.) This value is not to be exceeded (ARB 2010).
California Streets and Highways Code, Sections 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 with requirements of the California Scenic Highway Program.
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. Cities and counties can use open space easements as a mechanism to preserve scenic resources, if they have adopted open-space plans, as provided by the Open Space Easement Act of 1974 and codified in California Government Code (Section 51070 et seq.) According to the Act, a city or county may acquire or approve an open-space easement through a variety of means, including use of public money.

B. Agricultural and Forest Resources

1. Existing Conditions

Based on the value of agricultural products sold, California is the largest agricultural producer among all states in the U.S. California produces nearly half of the nation's grown fruits, nuts, and vegetables and is the nation's leading dairy state. California's agricultural abundance includes more than 400 commodities, many of which are produced solely in California. (CDFA 2010a). Of California's approximately 100 million acres of land, 43 million acres are used for agriculture (CDFA 2010b). Of this land area, 16 million acres are grazing land and 27 million acres are cropland. Approximately 9 million acres of irrigated land, or one-third of the State's cropland, is considered to be prime, unique, or of statewide importance.

Although California remains the nation's top agricultural producer, it has experienced significant farmland loss as a result of urbanization. The California Department of Food and Agriculture estimates that about 3.4 million acres of land in California's agricultural counties are now urbanized. Development consumes approximately 40,000 acres of agricultural land in California per year (CDFA 2010b). Other causes of agricultural land loss include the removal of agriculture for environmental purposes (such as the creation or enlargement of wildlife refuges) and withdrawals due to water shortages (CDFA 2010b).

California contains over 33 million acres of forests comprising a broad range of tree species, tree sizes, and levels of canopy closure (USFS 2008, p.124). Conifer forests and woodlands cover over 19 million acres and are most extensive in the Sierra, Modoc, and Klamath/North Coast bioregions of the State. Hardwood forests and oak woodlands cover over 13 million acres and extend mostly along the perimeter of the Sacramento and San Joaquin Valleys and throughout the coastal ranges (USFS 2008, p. 128). The most productive timber growing portion of California's forests are approximately 19 million acres of public and private timberland—that is, land capable of growing more than 20 cubic feet of wood per acre per year and statutorily available for timber management (USFS 2008, p. 127). In the case of public ownerships (53 percent of timberlands), many lands capable of timber production have been administratively withdrawn over the past two decades for a variety of purposes and have been directed to primary uses other than timber production. California has 9 million acres of privately owned timberland, of which 5.4 million acres are classified as timberland production zone where long-term tax and regulatory structures favor timber production over potential conversion to other uses (USFS 2008, p. 127).

2. Regulatory Setting

Table 3.B-1 below provides a general description of applicable laws and regulations that may pertain to agriculture and forest resources and the Proposed ACC Program.

Table 3.B-1. Applicable Laws and Regulations for Agriculture and Forest Resources	
Applicable Regulation	**Description**
Federal	
Farmland Protection Policy Act	The Farmland Protection Policy Act (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 of 1976	The National Forest Management Act (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 U.S. Forest Service'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 (Govt. Code, § 51200)	The California Department of Conservation'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 51202[e]). However, uses deemed compatible by a county or city government must be consistent with the principles of compatibility set forth in 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.

Table 3.B-1. Applicable Laws and Regulations for Agriculture and Forest Resources	
Applicable Regulation	**Description**
California Farmland Conservancy Program (Public Resources Code, §10200)	The program 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.
Farmland Mapping and Monitoring Program (FMMP) (Gov. Code §65570, PRC §612).	For this program, the California Department of Conservation 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 Lands 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 four 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. Scoping Plan projects located within these lands would be subject to the State Lands Commission permitting process.
Local	
Open Space Element	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.

C. Air Quality

1. Existing Conditions

The effects of the proposed ACC Program are evaluated in detail as contained in each respective Staff Report and are summarized in this EA. This evaluation is extensive because benefitting air quality conditions in California is both one of the primary objectives of the proposed ACC Program and the agency's environmental protection mandate. This environmental setting discussion provides an overview of how air quality is regulated in California and the state of existing air quality conditions. Though the GHG environmental setting is presented separately in Section D below, it is important to note that mobile source control programs address CAPs and TACs, and in the case of GHGs, it's in part to reduce temperature that exacerbates smog and causes PM from wildfires.

a. California's Criteria Air Pollutant and Toxics Regulatory Programs

The federal, State, and local governments all share responsibility for reducing air pollution. ARB is California's lead air agency and controls emissions from mobile sources, fuels, and consumer products, as well as air toxics. ARB also coordinates local and regional emission reduction measures and plans that meet federal and State air quality limits. At the federal level, the U.S. EPA has oversight of State programs. In addition, U.S. EPA alone establishes emission standards for certain mobile sources such as ships, trains, and airplanes.

Two criteria air pollutants and their precursors, (CAPs) are of most health concern in California (i.e., ozone and particulate matter with an aerodynamic diameter of 2.5 micrometers or less [$PM_{2.5}$]). The health risk from diesel particulate matter is the largest air toxics risk, both regionally and at locations such as ports and rail yards. ARB actions are lowering these health risks, and substantial new emission reductions in both CAPs and diesel particulate matter will occur between now and 2020.

Ozone, a major component of "smog", is not directly emitted as a pollutant, but is formed in the atmosphere when reactive organic gases (ROG) and oxides of nitrogen (NO_X) emissions react in the presence of sunlight. Ozone concentrations often peak downwind of the emission sources, which contributes to the regional nature of ozone air pollution.

$PM_{2.5}$ is a mixture of pollutants generated by a variety of sources. $PM_{2.5}$ can either be emitted directly into the air in forms such as soot and smoke, or it can be formed in the atmosphere from the reactions of pollutants including NO_X, oxides of sulfur (SO_X), ROG, and ammonia. While the impacts of directly emitted $PM_{2.5}$ may be seen near sources of air pollution, $PM_{2.5}$ that is formed in the atmosphere has a regional impact similar to ozone.

California's mature air quality program leads the nation in terms of stringency of required emission controls, not only for mobile sources but also for stationary sources.

Reducing emissions from combustion sources is at the core of California's program to meet air quality standards for ozone and $PM_{2.5}$. California's climate and CAP programs are complementary, and the AB 32 regulations ARB is adopting will provide co-benefits that will be incorporated into future air quality plans for ozone and $PM_{2.5}$.

b. Ambient Air Quality Standards and the State Implementation Plan

CAPs are the most prevalent air pollutants known to be deleterious to human health and extensive health-effects criteria documents are available. The federal Clean Air Act (CAA) required the U.S. EPA to establish national ambient air quality standards (NAAQS). The California Clean Air Act (CCAA), which was adopted in 1988, required the ARB to establish California ambient air quality standards (CAAQS). In addition to CAPs, ARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particulate matter. In most cases the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health effects studies considered during the standard setting process and the interpretation of the studies. The NAAQS and CAAQS are presented in Table 3.C-1.

Table 3.C-1. Ambient Air Quality Standards and Designations

Pollutant	Averaging Time	California	National Standards [1]	
		Standards [2,3]	Primary [3,4]	Secondary [3,6]
Ozone	1-hour	0.09 ppm (180 µg/m^3)	– [6]	Same as Primary Standard
	8-hour	0.070 ppm (137 µg/m^3)	0.075 ppm (147 µg/m^3)	
Carbon Monoxide (CO)	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	–
	8-hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (56 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as Primary Standard
	1-hour	0.18 ppm (338 µg/m^3)	0.100 ppm (188 µg/m^3)	
Sulfur Dioxide (SO_2)	24-hour	0.04 ppm (105 µg/m^3)		–
	3-hour	–	–	0.5 ppm (1300 µg/m^3)
	1-hour	0.25 ppm (655 µg/m^3)	0.075 ppm (196 µg/m^3)	–
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 µg/m^3	– [6]	Same as Primary Standard
	24-hour	50 µg/m^3	150 µg/m^3	

Table 3.C-1. Ambient Air Quality Standards and Designations

Pollutant	Averaging Time	California Standards [2,3]		National Standards [1] Primary [3,4]	National Standards [1] Secondary [3,6]
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 µg/m^3		15 µg/m^3	Same as Primary Standard
	24-hour	–		35 µg/m^3	
Lead[10]	30-day Average	1.5 µg/m^3		–	–
	Calendar Quarter	–		1.5 µg/m^3	Same as Primary Standard
	Rolling 3-Month Avg.	–		0.15 µg/m^3	
Sulfates	24-hour	25 µg/m^3		**No National Standards**	
Hydrogen Sulfide	1-hour	0.03 ppm (42 µg/m^3)			
Vinyl Chloride[7]	24-hour	0.01 ppm (26 µg/m^3)			
Visibility-Reducing Particle Matter	8-hour	Extinction coefficient of 0.23 per kilometer — visibility of 10 miles or more (0.07—30 miles or more for Lake Tahoe) because of particles when the relative humidity is less than 70%.	U		

1 National standards (other than ozone, PM, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. The PM_{10} 24-hour standard is attained when 99 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. The $PM_{2.5}$ 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current federal policies.

2 California standards for ozone, CO (except Lake Tahoe), SO_2 (1- and 24-hour), NO_2, PM, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. CAAQS are listed in the Table of Standards CCR, Title 17, Section 70200.

3 Concentration expressed first in units in which it was promulgated [i.e., parts per million (ppm) or micrograms per cubic meter (µg/m^3)]. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

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

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

6 The 1-hour ozone NAAQS was revoked on June 15, 2005. The annual PM_{10} NAAQS was revoked in October 2006.

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

Source: ARB 2010

Federal clean air laws require areas with unhealthy levels of CAPs (i.e., ozone, carbon monoxide [CO], nitrogen dioxide [NO_2], sulfur dioxide [SO_2], particulate matter with an aerodynamic diameter of 10 micrometers or less [PM_{10}], $PM_{2.5}$, and lead) to develop plans, known as State Implementation Plans (SIPs). SIPs are comprehensive plans that describe how an area will attain national ambient air quality standards (NAAQS). The 1990 amendments to the federal CAA set deadlines for attainment based on the severity of an area's air pollution problem.

The SIP is a compilation of new and previously submitted plans, programs (such as monitoring, modeling, permitting, etc.), district rules, State regulations and federal controls. Many of California's SIPs rely on the same core set of control strategies, including emission standards for cars and heavy trucks, fuel regulations and limits on emissions from consumer products. State law makes ARB the lead agency for all purposes related to the SIP. Local air districts and other agencies, such as the Bureau of Automotive Repair and the Department of Pesticide Regulation, prepare SIP elements and submit them to ARB for review and approval. ARB forwards SIP revisions to the U.S. EPA for approval and publication in the Federal Register. The Code of Federal Regulations Title 40, Chapter I, Part 52, Subpart F, Section 52.220 lists all of the items which are included in the California SIP. At any one time, several California measures have been submitted to U.S. EPA for their approval into the SIP (ARB 2009b).

c. Air Districts

The CCAA requires that all local air districts in the State endeavor to achieve and maintain the CAAQS by the earliest practical date. The Act specifies that local air districts should focus particular attention on reducing the emissions from transportation operations and area-wide emission sources, and provides districts with the authority to regulate indirect sources.

There are 35 air pollution control districts or air quality management districts (together, referred to as air districts) across California. Air districts attain and maintain air quality conditions in their respective jurisdictions through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean air strategy implemented by air districts includes the preparation of plans for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations concerning sources of air pollution, and issuance of permits for stationary sources of air pollution. Air districts also inspect stationary sources of air pollution and respond to citizen complaints, monitor ambient air quality and meteorological conditions, and implement programs and regulations required by the CAA, and the CCAA, primarily on stationary sources.

d. Clean Vehicle and Diesel Risk Reduction Programs

i. Criteria Air Pollutant Control Programs

Over the last several decades, California has dramatically tightened emission standards for on-road and off-road mobile sources and the fuels that power them. California's emission control program for on-road motor vehicles is the strongest in the world. New cars are now 99 percent cleaner than their uncontrolled counterparts prior to the mid-1960s. Trucks are now 90 percent cleaner than before the mid-1960s, and will be 98 percent cleaner by 2010.

ARB rules adopted as part of the Diesel Emission Reduction Program and Goods Movement Program are primarily toxics control measures (e.g., California has identified diesel PM as a TAC, but also achieve significant CAP emission reductions.

Working in concert with the U.S. EPA, standards for goods movement sources have also been tightened dramatically. By requiring low-sulfur fuel, SO_X emissions from ship auxiliary engines will be cut 96 percent from before the mid-2000s by 2010. New locomotive engines are now 50 to 60 percent cleaner than before the mid-2000s. Harbor craft emission standards were cut roughly in half from before the mid-2000s. New cargo handling equipment will be 95 percent cleaner by 2011 than before the mid-2000s.

California has also profoundly lowered emission standards for off-road sources, from lawn and garden equipment, to recreational vehicles and boats, to construction equipment and other large off-road sources. From 2010 through 2014, these new off-road sources will be manufactured to operate with 80-98 percent fewer emissions than their uncontrolled counterparts.

ARB has worked closely with U.S. EPA to regulate large diesel, gasoline and liquid petroleum gas equipment, over which authority is split between California and the federal government, and by 2014, new large off-road equipment will be 98 percent cleaner. ARB has also made great strides in reducing emissions from the smaller engines under concurrent State control, like those used in lawn mowers, jet skis, recreational vehicles, and boats. From 2010 to 2015, these new off-road sources will be manufactured with 82-90 percent lower emission levels than their uncontrolled counterparts.

Adopted regulations have made significant strides in reducing emissions from those mobile sources already in use (i.e., the legacy fleet) by keeping existing vehicles cleaner longer, getting cleaner technology on older vehicles and equipment, and replacing older dirtier vehicles and equipment with cleaner ones. Whereas new engine emissions have been regulated for a long time, most of the in-use control programs have just begun to apply and have an impact.

Many programs and rules are currently in place to reduce emissions from the mobile-source legacy fleets. The Smog Check Program ensures that passenger vehicles stay

clean as they age and on-board diagnostic systems identify emission control problems. Heavy-duty truck inspection programs help control smoke emissions and detect emission control mal-maintenance and tampering.

ARB has adopted well over 20 regulations in the last eight years. ARB's landmark regulations adopted in 2007 and 2008 will accelerate replacement of higher-emitting heavy-duty trucks, buses and construction equipment. Recently adopted regulations have required use of cleaner fuels, greatly reducing emissions from ships and harbor craft. ARB has adopted public and private fleet rules that require local governments and private companies to incorporate the cleanest vehicles and equipment into their fleets. Testing procedures and verification requirements for current emission control technology have been strengthened. In addition, other operational and emission control technology requirements that help reduce emissions from existing vehicle and equipment have been put into place.

Incentive programs have worked hand-in-hand with regulations, providing added emissions benefits. California is currently investing up to $140 million per year to clean up older, higher-emitting sources through the Carl Moyer Program. The Smog Check Breathe Easier Campaign pays motorists $1,000 to permanently retire their high polluting vehicles. Also, California Proposition 1B, also known as the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006, was on the November 7, 2006 ballot in California as a legislatively-referred bond act, where it was approved. Proposition 1B authorized the State of California to sell $19.925 billion of general obligation bonds to fund transportation projects "to relieve congestion, improve the movement of goods, improve air quality, and enhance the safety and security of the transportation system." Local governments use special vehicle registration fees to fund projects that further reduce emissions from motor vehicles.

In 2007 the Board adopted a new statewide strategy for reducing emissions that contribute to high ozone and $PM_{2.5}$ levels. The 2007 State Strategy, together with local control strategies, is designed to allow California to meet the U.S. EPA's national ambient air quality standards for ozone and $PM_{2.5}$. As of April, 2010, ARB had adopted twelve regulations to reduce CAP emissions and fulfill commitments made in the 2007 State Strategy. Some of the rulemakings were technical corrections to existing rules or deadline modifications, and did not further reduce emissions.

The adopted rules are shown in Table 3.C-2.

Table 3.C-2. Rules Adopted Pursuant to the 2007 State Strategy

ARB Rules	Adoption Date
Enhanced Vapor Recovery for Above Ground Storage Tanks	June 2007
Modifications to Reformulated Gasoline Program – Phase 3	June 2007
Cleaner In-use Off-Road Equipment	July 2007
Light-Duty Vehicle Catalyst Replacement	October 2007
Clean Up Existing Harbor Craft	November 2007
Port Truck Modernization	December 2007/ December 2008
Ship Auxiliary Engines (Cold Ironing)	December 2007
Consumer Products	June 2008/ November 2008
Clean Fuel Requirements for Ship Main Engines	July 2008
Spark-Ignition Marine Engine and Boat Regulations	July 2008
Portable Outdoor Marine Tanks Evaporative Emission Standards (partial)	September 2008
Large Spark-Ignited Engines, Rule Amendment	November 2008
Small Off-Road Engine Regulation	November 2008
Cleaner In-Use Heavy-Duty Trucks	December 2008
Gasoline Dispensing Facility Hoses	May 2009
Enhanced Fleet Modernization Program (Car Scrap)	June 2009
Consumer Products	September 2009
Portable Equipment	January 2010
Commercial Harbor Craft	June 2010
Stationary Compression Ignition Engines	October 2010
Consumer Products	November 2010
Transport Refrigeration Units	November 2010
In-Use Off-Road Diesel-Fueled Fleets	December 2010
Truck and Bus Regulation	December 2010
Ocean-Going Vessels	June 2011
Transport Refrigeration Units	October 2011
California Reformulated Gasoline	October 2011

The SIP and Statewide Strategy are focused on areas with pollution levels that exceed national air quality standards for ozone and $PM_{2.5}$. However, most of the control measures adopted pursuant to the Statewide Strategy will reduce emissions, and improve air quality, throughout the State. These controls also fulfill commitments made in ARB's Diesel Risk Reduction Plan (ARB 2000) and Goods Movement Emission

Reduction Plan (Business, Transportation and Housing Agency and California Environmental Protection Agency 2007), and help all areas make progress towards attaining California's more protective State ambient air quality standards.

ii. Diesel Risk Reduction Plan

In September 2000, ARB adopted an aggressive plan to require cleaner diesel fuel and cleaner diesel engines and vehicles. The Diesel Risk Reduction Plan targets reductions of diesel emissions from year-2000 levels by 75 percent by 2010 and 85 percent by 2020. Since the adoption of the Diesel Risk Reduction Plan, some of the strategies in place today that are reducing diesel PM include:

- Cleaner diesel fuel. The sulfur level in California diesel fuel was lowered to less than 15 parts per million in July 2006. ARB's fuel regulation applies to fuels for on-road, off-road, and stationary engines, while the federal low sulfur diesel rule applies only to on-road vehicles.

- Cleaner new diesel engines. In 2001, ARB adopted new PM and NO_X emission standards to clean up new on-road diesel engines that power big-rig trucks, trash trucks, delivery vans, and other large vehicles. The new PM standard is a 90 percent reduction from the previous PM standard.

- Cleaner in-use diesel engines. ARB has adopted regulations aimed at reducing PM and other pollutants from in-use diesel engines through engine replacement, retrofit with verified diesel emission control system to the existing engine, vehicle replacement with an alternative-fueled vehicle or a vehicle with a new and cleaner diesel engine, and operational modifications including reduced operating time or reduced idling.

iii. Goods Movement Action Plan

Air pollution from international trade and all goods movement in California is a major public health concern at both regional and community levels. Goods movement is now the dominant contributor to transportation emissions in the State. In April 2006, ARB approved the Emission Reduction Plan for Ports and Goods Movement in California to reduce the emissions and health risk in communities near ports, rail yards, and high-traffic corridors. The plan will reduce emissions of diesel PM, the NO_X and SO_X that contribute to fine particles, and, to a lesser extent, the ROG that mixes with NO_X in the atmosphere to form regional ozone. The plan envisions emission reductions at each step in the goods movement path, from ship to shore to truck or locomotive to the final destination.

e. Stationary Source Regulatory Program

Basic elements of the federal CAA include stationary source emissions standards and permits. The ARB does not have authority to issue permits directly to stationary sources of air pollution. Primary responsibility for permitting all sources, except vehicular sources, rests with the local and regional air districts.

f. Air Toxics Programs

Air quality regulations also focus on TACs, or in federal parlance hazardous air pollutants (HAPs). In general, for those TACs that may cause cancer, there is no concentration that does not present some risk. In other words, there is no threshold level below which adverse health impacts may not be expected to occur. This contrasts with the CAPs for which acceptable levels of exposure can be determined and for which the NAAQS and CAAQS have been established (Table 3.C-1). Instead, the U.S. EPA and ARB regulate HAPs and TACs, respectively, through statutes and regulations that generally require the use of the maximum or best available control technology for toxics (MACT and BACT) to limit emissions. These, in conjunction with additional rules set forth by air districts, establish the regulatory framework for TACs.

i. Federal Hazardous Air Pollutant Programs

The U.S. EPA has programs for identifying and regulating HAPs. Title III of the CAA directed the U.S. EPA to promulgate national emissions standards for HAPs (NESHAP). The NESHAP may differ for major sources than for area sources of HAPs. Major sources are defined as stationary sources with potential to emit more than 10 tons per year (TPY) of any HAP or more than 25 TPY of any combination of HAPs; all other sources are considered area sources.

The CAA also required the U.S. EPA to promulgate vehicle or fuel standards containing reasonable requirements that control toxic emissions, at a minimum applying 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.

ii. State and Local Toxic Air Contaminant Programs

TACs in California are primarily regulated through the Tanner Air Toxics Act (AB 1807, Statutes of 1983) and the Air Toxics Hot Spots Information and Assessment Act (AB 2588, Statutes of 1987). AB 1807 sets forth a formal procedure for ARB to designate substances as TACs. This includes research, public participation, and scientific peer review before ARB can designate a substance as a TAC. To date, ARB has identified over 21 TACs, and adopted the U.S. EPA's list of HAPs as TACs. Most recently, diesel PM was added to the ARB list of TACs.

Existing sources of TACs also include mobile sources (i.e., diesel-fueled internal combustion engines) on nearby roadways. According to the ARB, on-road diesel-fueled vehicles contribute approximately 24 percent of the statewide total of TAC emissions, with an additional 71 percent attributed to other mobile sources such as construction, mining, and agricultural equipment, and transport refrigeration units.

g. Air Quality Conditions

As a result of the emission reduction regulations and programs described above, California has made significant progress in reducing public exposure to unhealthy levels of air pollution, and ambient concentrations are now significantly lower than they were 20 years ago. However, at the same time, the targets for defining clean air have become more stringent. As a result, despite continuing improvements in air quality, more areas violate the new standards. Changes to the national ozone standards provide an illustration of this situation.

To keep pace with the current science, U.S. EPA periodically reviews the NAAQS and revises them as needed to reflect the most recent health information. U.S. EPA initially established the federal ozone standard as a 1-hour standard to protect against short-term exposure impacts. In the late 1990s, the 1-hour standard was replaced with an 8-hour standard to protect against long-term exposure impacts. More recent health studies indicate the need for an even more health protective standard, and U.S. EPA is currently considering an even lower level for the 8-hour standard.

Table 3.C-3 shows how various areas of California compare under the original 1-hour and current 8-hour national ozone standards in 1990 and 2009.

Table 3.C-3. Compliance with Federal Ozone Air Quality Standards in California's Major Urban Areas

AREA	1-Hour Ozone Standard (0.12 ppm)		8-Hour Ozone Standard (0.08 ppm)	
	Area Met Standard in 1990	Area Met Standard in 2009	Area Met Standard in 1990	Area Met Standard in 2009
Monterey Bay Area	✓	✓	✓	✓
Sacramento Metro Area		✓		
San Diego		✓		
San Francisco Bay Area		✓		✓
San Joaquin Valley				
San Luis Obispo County*		✓		✓
Santa Barbara County		✓		✓
South Coast				
Ventura County		✓		

Notes: * Available data show no violation of standard at San Luis Obispo sites, but the current high concentration site was not yet operating. Therefore, is very likely the area violated both standards in 1990. Sacramento has attained the 1-hour standard, based on 2009 data, but U.S. EPA has not yet formally made the announcement.

i. Ozone Trends

California's highest ozone concentrations are now close to half of what they were in 1990. In the South Coast Air Basin, the most populous California air basin, concentrations have decreased approximately 35 percent since 1990, and today nearly half (45 percent) the population (more than 6 million people) live in areas where ozone air quality meets the federal standard. Other portions of the South Coast Air Basin also show substantial improvement. The areas, and population, experiencing the highest ozone levels have decreased in size dramatically, and residents of the air basin experience those elevated levels on fewer days. Since 1990, the annual number of days that exceed the federal ozone standard have been cut nearly in half. Generally, the greatest improvements have occurred in areas that had the largest number of unhealthy days in 1990.

Air quality in California's inland areas continues to remain a significant challenge, and progress in the San Joaquin Valley has been slower than in other parts of California. However, although concentrations in the San Joaquin Valley have seen only a modest decrease, the frequency of exposure to unhealthy air has decreased significantly since 1990, with the average number of days exceeding the federal 8-hour ozone standard declining by 22 percent. In the San Francisco Bay Area ozone concentrations were only slightly higher than the federal standard in 1990 and have decreased approximately 11 percent since then. Ozone concentrations in the region are now below the federal 1-hour standard.

ii. $PM_{2.5}$ Trends

While $PM_{2.5}$ concentrations have only been measured for approximately ten years, significant progress has already occurred in this short time period. Annual average $PM_{2.5}$ concentrations have declined by at least 20 percent since 2002 throughout much of California. Similar progress has been seen in reducing daily (24-hour) concentrations. As with ozone, some of the most significant progress has occurred in the coastal areas.

In the South Coast Air Basin, both annual average and daily $PM_{2.5}$ concentrations have decreased by 30 to 50 percent since 2001. In addition, the number of days above the federal 24-hour $PM_{2.5}$ standard has decreased over 80 percent, dropping from 120 days in 2001 to less than 20 days today.

The San Francisco Bay Area Air Basin met the federal annual average $PM_{2.5}$ standard in 2001, and $PM_{2.5}$ concentrations have decreased nearly 30 percent since then. Daily concentrations are only slightly above the federal standard and occur in only a small region in the East Bay.

We continue to face significant challenges to improving $PM_{2.5}$ levels in the San Joaquin Valley. Nevertheless, annual average concentrations have decreased approximately 10 percent since 2001 and the most recent year's data shows that values continue to decrease. While the Bakersfield region in the southern end of the San Joaquin Valley

experiences the highest levels of $PM_{2.5}$, other monitors throughout the San Joaquin Valley are only reaching values at or near the federal standard.

iii. Toxic Air Contaminant Trends

ARB maintains a statewide air quality monitoring network for TACs that currently includes 17 monitoring stations measuring ambient concentrations of over 60 substances. Nine individual air toxics, including diesel PM, account for the majority of the potential health risk in California. Exposure to diesel PM is the largest health concern, accounting for approximately 80 percent of the statewide risk. Unlike other air toxics, there is currently no method for directly monitoring diesel PM concentrations in the ambient air. However, diesel PM concentrations can be estimated from levels of other co-pollutants such as NO_X and elemental carbon. Over the last 20 years, concentrations of these indicators have decreased substantially.

As a result of controls on motor vehicles, fuels, stationary sources, and consumer products, the public's exposure to other air toxics has also decreased dramatically. Between the early 1990's and today, the decrease in statewide average health risk ranged from approximately 20 percent for formaldehyde, to approximately 90 percent for perchloroethylene. Air toxics associated with motor vehicles and their fuels such as 1,3-butadiene and benzene have also seen significant decreases of 80 to 85 percent as a result of ARB's mobile source control program. In aggregate, the estimated cancer risk from air toxics has been reduced by approximately 60 percent since the early 1990s.

It is important to note, however, that the routine air toxics monitoring network is designed to reflect regional exposures. Although ongoing control programs have been effective in reducing regional levels, there may still be situations of localized toxics exposure due to proximity to individual sources. Specialized monitoring studies are often needed to better characterize these localized impacts, which often have very steep gradients that drop off quickly farther from the source. Thus, conducting monitoring to capture these gradients is generally resource intensive.

2. Regulatory Setting

Table 3.C-4 below provides a general description of applicable laws and regulations that may pertain to air quality and the Proposed ACC Program. See Table 3.D-1 for discussion of GHG-related laws and regulations. Though these are not directly related to CAPs, those identified in Table 3.D-X regulate GHGs that contribute to global warming, which in turn impacts compliance with the CAAQS and NAAQS (e.g., climate penalty, where rising temperatures increase ground level ozone and airborne health-damaging particles, despite the reductions achieved by programs targeting smog-forming emissions from cars, trucks and industrial sources).

Table 3.C-4. Applicable Laws and Regulations for Air Quality	
Regulation	**Description**
Federal	
Clean Air Act (40 CFR)	The Clean Air Act, which was last amended in 1990, requires U.S. EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The Clean Air Act 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. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. U.S. EPA Office of Air Quality Planning and Standards (OAQPS) has set NAAQS for six principal pollutants, which are called "criteria" pollutants. Title III of the CAA directed the EPA to promulgate national emissions standards for HAPs (NESHAP). The CAA also required the EPA to promulgate vehicle or fuel standards containing reasonable requirements that control toxic 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.
Other Applicable Federal-Level Regulations	This includes all other applicable regulations at the federal level for portions of the project area that are outside of the U.S. (e.g., Canada).
State	
CCR (Titles 13 and 17)	ARB is the agency responsible for coordination and oversight of State and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA). The CCAA, which was adopted in 1988, required the ARB to establish California ambient air quality standards (CAAQS).
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., AB 1807 and AB 2588).

D. Greenhouse Gases

1. Existing Conditions

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°F (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° (57°C), registered in Death Valley on 10 July 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 20 January 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), the January average minimum 49°F (9°C), and the July average 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 of 93°F (34°C).

Annual precipitation varies from only 2 in (5 cm) in the Imperial Valley to 68 in (173 cm) at Blue Canyon, near Lake Tahoe. San Francisco had an average annual precipitation (1971–2000) of 20 in (51 cm), Sacramento 17.9 in (45.5 cm), Los Angeles 13.2 in (33.5 cm), and San Diego 10.8 in (27.4 cm). The largest one-month snowfall ever recorded in the US, 390 in (991 cm), fell in Alpine County in January 1911. Snow averages between 300 and 400 in (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 mph (18 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), a scientific body established by the World Meteorological Organization (WMO) and by the United Nations Environment Programme (UNEP), 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, carbon dioxide, methane, nitrous oxide, 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 because GHG emissions are higher and warming is occurring faster than at any other time on record within the past 650,000 years. Historical long-term as well as decadal and inter-annual fluctuations in the Earth's climate 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. GHG emissions from human activities that contribute to climate change include the burning of fossil fuels (such as coal, oil and natural gas), cutting down trees (deforestation) and developing land (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 store ("sequester") carbon dioxide. Emissions of GHGs due to human activities have increased globally since pre-industrial times, with an increase of 70 percent between 1970 and 2004 (IPCC 2007b).

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, 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 (Department of Environment 2010). Six major GHGs have been the focus of efforts to reduce emissions: CO_2, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF_6). They are regulated under the Kyoto Protocol.

The "global warming potential" (GWP) metric is used to convert all GHGs into "CO_2-equivalent" 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 CO_2. For example, N_2O's GWP is 310, meaning a unit mass of N_2O warms the atmosphere 310 times more than a unit mass of CO_2. SF_6 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, CO_2 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 CO_2 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 CO_2 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.

In recent years there has been increased attention in the particle research community about the potential of black carbon (BC) to cause global warming. The major anthropogenic sources of BC are fossil fuels and biofuels (biomass burning for domestic energy). The ability of BC to absorb light energy and its role in key atmospheric processes link it to a range of climate impacts, including increased temperatures, accelerated ice and snow melt, and disruptions to precipitation patterns. It has been proposed that light absorbing particles in the atmosphere act as a GHG whose net forcing is warming only second to CO_2 (Ramanathan and Carmichael 2008). This estimate of the forcing due to BC is larger than most prior estimates including those of the IPCC 4^{th} assessment report (IPCC 2007c).

Global warming is no longer a matter of the future or of places far away. Rather, climate change is already evident in California, and it is happening now. Climate change is a critical issue facing California's citizens, ecosystems, and economic vitality. Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the State's infrastructure, water supplies, and natural resources. The State has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and both snowmelt and rainwater running off sooner in the year. These climate driven changes affect resources critical to the health and prosperity of California. For example, forest wild-land fires are becoming more frequent and intense due to dry seasons that start earlier and end later. Agriculture is especially vulnerable to altered temperature and rainfall patterns, and new pest problems. The State's water supply, already stressed under current demands and expected population growth, will shrink under even the most conservative projected climate change scenario Almost half a million Californians,

many without the means to adjust to expected impacts, will be at risk from sea level rise along Bay and coastal areas. California's infrastructure is already stressed and will face additional burdens from climate risks. And as the Central Valley becomes more urbanized, more people will be at risk from intense heat waves (CEC 2009).

Borrowing from recent findings by the IPCC, the projected climate change-related exposures are likely to affect the health status of people, particularly those with low adaptive capacity, increased deaths, disease and injury due to heat waves, floods, storms, fires and droughts (IPCC 2007a). In California, low socioeconomic status and minority communities are potentially more vulnerable to health impacts associated with increasing temperatures due to less access to cooling centers, air conditioning, and limited access to health care. In some instances, limited ability to speak and/or understand English will make it difficult for certain environmental groups to learn about the most up-to-date information on extreme heat events, their impacts, and adaptive strategies. The economic impacts of a warming world will also be felt by all, but especially by low income communities, as the price of energy and food (and possibly health care) increase due to a changing climate.

In summary, extreme events from heat waves to floods to droughts to wildfires and bad air quality episodes are likely to become more frequent in the future and pose serious challenges to Californians. The diversity and size of California's agricultural sector creates unique challenges in its responses to climate changes, as they will affect crop productivity that could lead to large losses. California's water and hydropower energy resources are also vulnerable to climate change. Without changes in operating rules for the water system in California the reliability of water supply will be severely affected. By end of this century electricity demand would increase by 20 to 50 percent even in the low or medium IPCC GHG emission scenarios. These changes represent substantial impacts to California's residents and an added considerable stress to the electricity generating sector. California is one of the few hot spots for biodiversity in the world and new studies, which complementing early studies, suggest that climate change can severely reduce biodiversity in California or at least eliminate important endemic species. Economic evaluations of potential impacts due to climate change show that climate change could impose substantial costs to Californians in the order of tens of billions of dollars per year.

California is exemplary in the nation for its commitment to State-funded climate change research, its efforts to understand the climate risks it faces, and its wide range of efforts to confront the challenge. Abundant scientific evidence now shows that climate change is not just a future problem, but is already observable now, with measurable impacts for the State's citizens, natural resources, and economic sectors. California's position as a national leader of State-sponsored climate change research provides us a unique perspective on how best to manage for the effects of climate change. California must pursue a dual approach to managing its climate risks (e.g., reducing GHGs, mitigation, minimizing the impacts of climate change, and adaptation) with the overall goal of ensuring public safety and welfare, continued economic vitality of the State's climate-sensitive sectors.

Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants (TACs), which are pollutants of regional and local concern. Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (about 1 day), GHGs have long atmospheric lifetimes (1 year to several thousand years). GHGs persist in the atmosphere for long enough time periods to be dispersed around the globe. Although the exact lifetime of any particular GHG molecule is dependent on multiple variables and cannot be pinpointed, it is understood that more CO_2 is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO_2 emissions, approximately 54 percent is sequestered through ocean uptake, uptake by northern hemisphere forest regrowth, and other terrestrial sinks within a year, whereas the remaining 46 percent of human-caused CO_2 emissions remains stored in the atmosphere (Seinfeld and Pandis 1998).

Similarly, impacts of GHGs are borne globally, as opposed to localized air quality effects of criteria air pollutants and TACs. The quantity of GHGs that it takes to ultimately result in climate change is not precisely known; suffice it to say, the quantity is enormous, and no single project alone would measurably contribute to a noticeable incremental change in the global average temperature, or to global, local, or micro climate. From the standpoint of CEQA, GHG impacts to global climate change are inherently cumulative.

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. Emissions of CO_2 are byproducts of fossil fuel combustion. CH_4, a highly potent GHG, resulting primarily from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions), is largely associated with agricultural practices and landfills. N_2O is also largely attributable to agricultural practices and soil management. CO_2 sinks, or reservoirs, include vegetation and the ocean, which both absorb CO_2 through sequestration and dissolution, respectively, two of the most common processes of CO_2 sequestration.

California is the 12th to 16th largest emitter of CO_2 in the world (CEC 2006a). California produced 484 million gross metric tons of CO_2 equivalent (CO_2e) in 2004 (ARB 2009c). CO_2e 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., global warming potential [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 2009), 1 ton of CH_4 has the same contribution to the greenhouse effect as approximately 21 tons of CO_2. Therefore, CH_4 is a much more potent GHG than CO_2. Expressing emissions in CO_2e 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 CO_2 were being emitted.

The California GHG inventory compiles statewide anthropogenic GHG emissions and sinks. It includes estimates for CO_2, CH_4, N_2O, SF_6, nitrogen trifluoride (NF_3), HFCs, and PFCs. The current inventory covers years 2000 to 2008 (ARB 2009c).Combustion of fossil fuel in the transportation sector was the single largest source of California's GHG emissions, accounting for 36 percent of total GHG emissions in the State. This sector was followed by the electric power sector (including both in-state and out-of-state sources) (24 percent) and the industrial sector (21 percent).

d. Adaptation to Climate Change

According to the IPCC, which was established in 1988 by the World Meteorological Organization and the United Nations Environment Programme, global average temperature is expected to increase by 3–7°F by the end of the century, depending on future GHG emission scenarios (IPCC 2007d). 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 (including the project site). According to the California Energy Commission (CEC 2006b), the snowpack portion of the water supply could potentially decline by 30–90 percent by the end of the 21st century. A study cited in a report by the California Department of Water Resources (DWR) projects that approximately 50 percent of the statewide snowpack will be lost by the end of the century (Knowles and Cayan 2002). Although current forecasts are uncertain, it is evident that this phenomenon could lead to significant challenges in securing an adequate water supply for a growing population. An increase in precipitation falling as rain rather than snow also could lead to increased potential for floods because water that would normally be held in the Sierra Nevada until spring could flow into the Central Valley concurrently with winter storm events. This scenario would place more pressure on California's levee/flood control system (DWR 2006).

Another outcome of global climate change is sea level rise. Sea level rose approximately 7 inches during the last century and it is predicted to rise an additional 7–22 inches by 2100, depending on the future levels of GHG emissions (IPCC 2007d). If this occurs, resultant effects could include increased coastal flooding, saltwater intrusion (especially a concern in the low-lying Sacramento–San Joaquin River Delta, where pumps delivering potable water could be threatened), and disruption of wetlands (CEC 2006b). As the existing climate throughout California changes over time, the ranges of various plant and wildlife species could shift or be reduced, depending on the favored temperature and moisture regimes of each species. In the worst cases, some species would become extinct or be extirpated from the State, if suitable conditions are no longer available.

2. Regulatory Setting

Table 3.D-1. Applicable Laws and Regulations for Greenhouse Gases	
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 United States. In general, this national reporting requirement will provide U.S. EPA with accurate and timely GHG emissions data from facilities that emit 25,000 metric tons or more of CO_2 per year. This publically 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	On September 15, 2009, U.S. EPA and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) proposed a new national program that would reduce GHG emissions and improve fuel efficiency for all new cars and trucks sold in the United States. U.S. EPA proposed the first-ever national GHG emissions standards under the CAA, and NHTSA proposed Corporate Average Fuel Economy (CAFE) standards under the Energy Policy and Conservation Act. 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 the Department of Transportation, develop, through notice and comment rulemaking, a coordinated National Program under the Clean Air Act (CAA) and the Energy Policy and Conservation Act (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. 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). The first part of this program (i.e., 2012-2016) is implemented. The next part (i.e., 2017-2025) is currently in process for which ARB is proposed to accept compliance thereof as also being acceptable for California compliance, similar to what was done for the first part .

Table 3.D-1. Applicable Laws and Regulations for Greenhouse Gases	
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 of 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 or not the concentrations of the six key GHGs (i.e., carbon dioxide [CO_2], methane [CH_4], nitrous oxide [N_2O], hydrofluorocarbons [HFCs], perfluorocarbons [PFCs], and sulfur hexafluoride [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 from new motor vehicles and motor vehicle engines contribute to atmospheric concentrations of GHGs and therefore the threat of climate change. 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, 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. 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 the Department of Transportation.
State	
Executive Order S-3-05	Executive Order 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 total greenhouse gas emission 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. The Executive Order directed the Secretary of the California Environmental Protection Agency (CalEPA) to coordinate a multi-agency effort to reduce greenhouse gas emissions to the target

Table 3.D-1. Applicable Laws and Regulations for Greenhouse Gases	
	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 Executive Order, the Secretary of the CalEPA created the California Climate Action Team (CCAT) made up of members from various State agencies and commission. CCAT 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.
Assembly Bill 32, the California Global Warming Solutions Act, Statutes of 2006	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 ARB to develop and implement regulations to reduce statewide GHG emissions from substantial stationary and mobile source categories. AB 32 requires that ARB 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.
Assembly Bill 1493, Statutes of 2002	In September 2004, ARB approved regulations to reduce GHG emissions from new motor vehicles. The Board took this action pursuant to Chapter 200, Statutes of 2002 (AB 1493, Pavley regulations) which directed the Board to adopt regulations that achieve the maximum feasible and cost effective reduction in greenhouse gas 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.
Executive Order S-1-07	Executive Order 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 ARB to determine if this Low Carbon Fuel Standard could be adopted as a discrete early action measure after meeting the mandates in AB 32. ARB adopted the LCFS on April 23, 2009.

Table 3.D-1. Applicable Laws and Regulations for Greenhouse Gases	
Senate Bill 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 the California Public Utilities Commission (PUC) to establish a GHG emission performance standard for baseload generation from investor owned utilities by February 1, 2007. The CEC must establish a similar standard for local publicly owned utilities by June 30, 2007. These standards cannot exceed the greenhouse gas 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 the PUC and CEC.
Senate Bill 1078, Statutes of 2002, Senate Bill 107, Statutes of 2006,and Executive Order S-14-08	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 November 2008, former Governor Schwarzenegger signed Executive Order S-14-08, which expands the State's Renewable Energy Standard to 33 percent renewable power by 2020.
Senate Bill 97, Statutes of 2007	As directed by SB 97, the Natural Resources Agency adopted Amendments to the CEQA Guidelines for greenhouse gas 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.
Senate Bill 375, Statutes of 2008	SB 375, signed in September 2008, aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy (APS), which will prescribe land use allocation in that MPO's Regional Transportation Plan (RTP). ARB, in consultation with MPOs, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every 8 years, but can be updated every 4 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. This bill also extends the minimum time period for the Regional Housing Needs Allocation (RNHA) cycle from 5 years to 8 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 incentivize qualified projects that are consistent with an approved SCS or APS, categorized as "transit priority projects."

Table 3.D-1. Applicable Laws and Regulations for Greenhouse Gases	
Executive Order S-13-08	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 Executive Order S-13-08 on November 14, 2008. This executive order directed the California Natural Resources Agency (CNRA) to develop the 2009 California Climate Adaptation Strategy (CNRA 2009), 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, forestry, and transportation and energy infrastructure—and provides recommendations on how to manage against those threats. This executive order also directed 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 (CNRA 2009) and OPR continues to further refine land use planning guidance related to climate change impacts. Executive Order 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: 1. Relative sea level rise projections specific to California, taking into account issues such as coastal erosion rates, tidal impacts, El Niño and La Niña events, storm surge, and land subsidence rates; 2. The range of uncertainty in selected sea level rise projections; 3. 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 4. discussion of future research needs regarding sea level rise for California.

E. Biological Resources

1. Existing Conditions

California is one of the most biologically diverse areas in the world. Its varied topography and climate have given rise to a remarkable diversity of habitats and a correspondingly diverse array of both plant and animal species. California has more species than any other state in the U.S. and also has the greatest number of endemic species, those that occur nowhere else in the world (DFG 2007, p.11).

California contains examples of most of the major biomes in North America, including grassland, shrubland, deciduous forest, coniferous forest, alpine tundra, mountains, deserts, temperate rainforest, marine, estuarine, and freshwater habitats. Each of these biomes contains many different types of plant communities, such as redwood forests, vernal pool wetlands, or blue oak woodlands. Altogether, the State supports 81 types of forests, 107 types of shrub lands, and 52 types of plant communities dominated by herbaceous plants, in addition to 27 other types of vegetation (Sawyer and Keeler-Wolf 1995, vegetation series tables).

Some parts of the State are particularly rich in plant species diversity. Areas with the greatest number of plant species are the Klamath and inner North Coast ranges, the high Sierra Nevada, the San Diego region, and the San Bernardino Mountains. Other regions with considerable plant diversity are the outer North and Central Coast Ranges, the Cascade Range, the Sierra Nevada foothills, and the western transverse Range (DFG 2007, p.13).

California has a great number of animal species, representing large portions of wildlife species nationwide. The State's diverse natural communities provide a wide variety of habitat conditions for wildlife. The State's wildlife species include 84 species of reptiles (30 percent of the total number found in the U.S.); 51 species of amphibians (22 percent of U.S. species); 67 species of freshwater fish (8 percent of U.S. species); 433 species of birds (47 percent of U.S. species); and 197 mammal species (47 percent of U.S. species). Seventeen species of mammals, 17 species of amphibians, and 20 species of freshwater fish live here and nowhere else (DFG 2007, p. 13). Animal species are not equally distributed across the State. Some of California's natural communities are particularly rich in wildlife species, supporting hundreds of species each. Twenty-four habitats—including valley foothill riparian, mixed conifer, freshwater wetlands, mixed chaparral, and grasslands in the State—support more than 150 terrestrial animal species each. Oak woodlands also are among the most biological diverse communities in the State, supporting 5,000 species of insects, more than 330 species of amphibians, reptiles, birds and mammals, and several thousand plant species (DFG 2007, p.14).

2. Regulatory Setting

Biological resources in California are protected and/or regulated by a variety of federal, State, and local laws and policies. Key regulations and polices applicable to the proposed ACC Program are summarized in Table 3.E-1.

Table 3.E-1. Applicable Laws and Regulations for Biological Resources

Applicable Law	Description
Federal	
Federal Endangered Species Act	Designates and provides for protection of threatened and endangered plant and animal species, and their critical habitat.
Migratory Bird Treaty Act	Makes it unlawful to take or possess any migratory nongame bird (or any part of such migratory nongame bird) as designated in the Migratory Bird Treaty Act.
Clean Water Act	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 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	Requires permit or letter of permission from USACE prior to any work being completed within navigable waters.
U.S. Environmental Protection Agency (U.S EPA) Section 404 (b)(1) Guidelines	Requires the USACE to analyze alternatives in a sequential approach such that the 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 Plan (CDCA)	Comprises one of two national conservation areas established by Congress at the time of the passage of the Federal Land and Policy Management Act (FLPMA). FLPMA outlines how BLM would manage public lands. Congress specifically provided guidance for the management of the CDCA and directed the development of the 1980 CDCA Plan.
Federal Noxious Weed Act of 1974 (P.L. 93-629) (7 U.S.C. 2801 et seq.; 88 Stat. 2148)	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	Federal agencies are mandated to 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.

Table 3.E-1. Applicable Laws and Regulations for Biological Resources	
Applicable Law	**Description**
Executive Order 11988, "Floodplain Management," May 24, 1977	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	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	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 the U.S. Fish and Wildlife Service (USFWS) that shall promote the conservation of migratory bird populations.
Wild Free-Roaming Horses and Burros Act	Provides for the protection of wild free-roaming horses and burros. Directs BLM and the U.S. Forest Service (USFS) to manage wild horses and burros on lands under their jurisdiction.
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 (BLM 2001),	Establishes special status species policy on BLM land for plant and animal species and the habitats on which they depend. The policy refers species designated by the BLM State Director as sensitive.
Listed Species Recovery Plans and Ecosystem Management Strategies	Provides 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 Management Strategy; Amargosa Vole Recovery Plan, Recovery Plan for Upland Species of the San Joaquin Valley, California.
State	
California Endangered Species Act of 1984 (Fish and Game Code, sections 2050 through 2098)	Protects California's rare, threatened, and endangered species.
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.
Z'berg-Nejedly Forest Practice Act	Ensures that logging on timberland is performed in a manner that will preserve and protect fish, wildlife, forests and streams, enforced by CAL FIRE.

Table 3.E-1. Applicable Laws and Regulations for Biological Resources	
Applicable Law	**Description**
California Forest Practice Rules 2010	State Board of Forestry and Fire Protection has authority delegated by legislature to adopt forest practice and fire protection regulations on nonfederal lands. These regulations carry out California legislature's mandates to protect and enhance the State's unique forest and wildland resources.
Wetlands Preservation (Keene-Nejedly California Wetlands Preservation Act) (Public Resources Code, 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 Preservation System (Public Resources Code, Section 5093.30 et seq.)	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.)	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 section 3503 and 3503.5)	Protects 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)	Protects California's migratory birds by making it unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame birds.
Fur-bearing Mammals (Fish and Game Code sections 4000 and 4002)	Lists fur-bearing mammals which require a permit for take.
Fully Protected Species (Fish and Game Code Sections 3511,4700, 5050, and 5515)	Identifies several amphibian, reptile, fish, bird and mammal species which are Fully Protected. The California Department of Fish and Game (CDFG) cannot issue a take permit), except for take related to scientific research.
California Environmental Quality Act (CEQA Guidelines, CCR, Title 14, 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 consideration in environmental analyses. Included in this category are many plants considered rare by the California Native Plant Society (CNPS) and some animals on the CDFG's Special Animals List.

Table 3.E-1. Applicable Laws and Regulations for Biological Resources	
Applicable Law	**Description**
Oak Woodlands (California Public Resources Code Section 21083.4)	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 sections 1600 et seq.)	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 CDFG 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)	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	The California Department of Food and Agriculture is designated to prevent the introduction and spread of injurious insect or animal pests, plant diseases, and noxious weeds.
Noxious Weeds (Title 3, California Code of Regulations, Section 4500)	List of plant species that are considered noxious weeds.
Regional and Local	
Regional Habitat Conservation Plans and Natural Communities Conservation Plan (HCP/NCCP)	HCPs and NCCPs establish a coordinated process for permitting and mitigating the incidental take of endangered species and conserving natural resources. Approved HCPs and NCCPs potentially relevant to proposed ACC Program include, but are not limited to, the Western Riverside County HCP; Lower Colorado River Multi-Species Conservation Plan; Coachella Valley Multi-Species HCP; Orange County Central/Coastal NCCP/HCP; Kern Water Bank HCP; Southeastern Lincoln County, NV HCP; and the Mojave and Colorado Desert regions and Solano Multispecies Habitat Conservation Plan.
Various City and County General Plans	General plans typically designate areas for land usages, 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.

F. Cultural Resources

1. Existing Conditions

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.

All areas within California have the potential for yielding as 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; 14 CCR 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.

California was occupied by different prehistoric cultures dating to at least 12,000 years ago. Evidence for the presence of humans prior to about 8,000 years ago during the Paleoindian Period is relatively sparse and scattered throughout the State. With climate changes and the drying of pluvial lakes, subsistence during the Early and Middle Archaic Periods shifted to an increased emphasis on plant resources, evidenced by an abundance of milling implements in archaeological sites dating between 8,000 and 3,000 years ago. After 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, permanently occupied settlements, and the expansion of regional populations and trade networks, as well as the development of social stratification and craft specialization.

At the time of European contact, California was the home of approximately 310,000 indigenous people with a complex of cultures distinguished by linguistic affiliation and territorial boundaries. Distinct native Californian cultural groups spoke approximately 74 languages. At least 70 groups, with even more subgroups, inhabited the vast lands

within the State. In general, these mainly sedentary, complex hunter-gatherer groups shared similar subsistence practices (hunting, fishing, and collecting plant foods), settlement patterns, technology, material culture, social organization, and religious beliefs. They situated permanent villages 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 occurring in the Santa Barbara Channel area and the least in the State's desert region.

The effect of Spanish settlement and establishment of missions in California marks the beginning of a devastating disruption of native culture, 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. California's native population was reduced to about 100,000 people by 1850; by 1900, there were only 20,000--less than seven percent of the pre-contact number (Smithsonian Institution 1978). Existing reservations were created in California by the federal government beginning in 1858 but encompass only a fraction of native lands. Many California groups continue to await federal tribal status recognition.

In 1848, shortly after California became a territory of the U.S., gold was discovered at Sutter's Mill. The resulting Gold Rush era influenced the history of the State and the nation. Thousands of people flocked to the gold fields along the Sierra foothills, and in 1850 California became the 31st State. After the completion of the transcontinental railroad in 1869, settlers and immigrants continued to pour into the State. Settlement of the American West was also encouraged by passage of the Swampland Acts of the mid 1800s-early 1900s and the Homestead Act of 1862, among others. The multi-ethnic character of the State today is one result of the Gold Rush, plus later waves of migration. Buildings and structures in today's urban cores, rural landscapes, coastlines, deserts, forests, and parks, as well as historic archaeological sites, reflect the importance of mining, the growth of agriculture, ranching and transportation networks, and the economic development of industries based on the State's wealth of natural resources, such as lumber, minerals, fish, and petroleum deposits, that contributed to the State's economy and its continuing growth and development. Architectural resources also reflect the development in California in the mid- to late-1900s of the defense, aerospace, communication and tourism industries.

Significant nonrenewable vertebrate or invertebrate fossils or unique geologic units have been documented throughout the State and are likely present in many out-of-state areas. Because the majority of California 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, the Klamath Mountains, Jurassic shales, sandstones and limestones along the edges of the Central Valley, and portions of the Coast and Transverse Ranges, and the Peninsular Ranges. As a result of changes in sea level and increases in tectonic activity during the Tertiary, marine as well as terrestrial fossils may be found scattered about the State, particularly along the coast, edges of the Central Valley, northeastern plateau, and southeastern deserts. Tertiary marine fossils have been found, for example, under the streets of Los Angeles during

storm drain and subway construction. Dating between 1.8 million and 11,000 years ago, Pleistocene continental sedimentary rock units are found throughout the State and have yielded a variety of plant and vertebrate fossils. Pleistocene fossil localities include large lake deposits, such as Lake Manix in the Mojave Desert, marine terrace deposits along the coast, particularly the southern coast, and the La Brea Tar Pits, a well-known locality in Los Angeles that has produced a variety of extinct terrestrial fauna dating to the last Ice Age. Extinct Pleistocene fossils, including mammoths, have also been found during development projects near Sacramento, in Livermore, in southern California, and on the Channel Islands. Holocene-age deposits (less than 11,000 years old), such as those that blanket the majority of the Central Valley floor, are geologically immature and generally unlikely to contain fossils. One exception is the Lake Cahuilla deposits in today's Colorado Desert that have yielded freshwater fossils and small terrestrial vertebrates and date between 270 and at least 6,000 years ago.

2. Regulatory Setting

Applicable laws and regulations associated with cultural resources are discussed in Table 3.F-1.

Table 3.F-1. Applicable Laws and Regulations for Cultural Resources

Applicable Regulation	Description
Federal	
National Historic Preservation Act (NHPA) of 1966	Requires federal agencies to consider the preservation of historic and prehistoric resources. The Act 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 Act requires federal agencies to take into account 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 of 1969	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 any major federal actions significantly affecting environmental quality, federal agencies must prepare, and make available for public comment, an environmental impact statement (EIS).
Archaeological Resources Protection Act of 1979 (NRPA) (16 USC 470aa-470ll)	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.

Table 3.F-1. Applicable Laws and Regulations for Cultural Resources	
Applicable Regulation	**Description**
Advisory Council Regulation, Protection of Historic Properties (36 CFR 800)	Establishes procedures for compliance with Section 106 of the National Historic Preservation Act of 1966. 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, National Register of Historic Places (NRHP) (36 CFR 60)	Sets 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 (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 U.S. 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.
Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (PL 101–601)	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 Act 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 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.
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 Highway 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

Table 3.F-1. Applicable Laws and Regulations for Cultural Resources	
Applicable Regulation	**Description**
	inventories of the locations and likely impacts on resources that fall into the Section 4(f) category are required in project-level environmental assessments.
State	
California Health and Safety Code Section and California Public Resources Code, Section	Disturbance of human remains without the authority of law is a felony (California Health and Safety Code, Section 7052). According to State law (California Health and Safety Code, Section 7050.5, California Public Resources Code, 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 Public Resources Code 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 California Health and Safety Code, six or more human burials at one location constitute a cemetery (Section 8100), and disturbance of Native American cemeteries is a felony (Section 7052). Section 7050.5 requires that construction or excavation be stopped in the vicinity of 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 (California Health and Safety Code, 7052.5c; Public Resources Code, Section 5097.98).
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 (pursuant to section 5020.1(k) of the Public Resources Code). 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 local protection. The policies outlined in the individual general plans should be consulted prior to any undertaking or project.

Table 3.F-1. Applicable Laws and Regulations for Cultural Resources	
Applicable Regulation	**Description**
Cooperative Agreements Among Agencies	Cooperative agreements among land managing agencies (BLM, National Park Service, U.S. Forest Services, California State Parks, Bureau of Indian Affairs, Department of Defense, to name a few) the SHPO and ACHP may exist and will need to be complied with on specific projects. In addition, certain agencies have existing Programmatic Agreements (PA) requiring permits (CPUC, BLM) to complete archaeological investigations and employ the Secretary of Interior's Professional Qualification Standards and Guidelines (36 CFR 61).

G. Geology and Soils

1. Existing Conditions

a. Soils

California has a diverse, complex and seismically active geology that includes a vast array of landforms. Soils in California are as diverse as its geology, and are described and characterized individually and collectively with other soils, and their various compatible uses in soil surveys published by the U.S. Department of Agriculture. 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.

b. Geology

California's geologic history is associated with major episodes of tectonic activity including intrusive and extrusive volcanic activity, folding and faulting, and mountain building. The most recent period of mountain building is still going on, and practically all of the current landforms and geographic features are very young in geologic terms, only a few million years old. Rocks older than 600 million years, those of the Precambrian Era, are rare in California.

The oldest rocks, which are more than 1,000 million years old, are located in the eastern deserts and the eastern Transverse Ranges (San Bernardino and San Gabriel Mountains). The distribution of rocks of these ages suggests that the west coast of the North American Continent was well to the east of all but the southern end of what is now California. All of these very old formations have been extensively metamorphosed and, therefore, it is difficult to determine the conditions that existed when they were originally formed. Some of the oldest rocks (around 1,800 million years old) are located in the mountains around Death Valley and are much like the rocks exposed in the inner gorge of the Grand Canyon. Metamorphic rocks around 1,000 million years old are located in the San Gabriel Mountains and the Orocopia Mountains east of the Salton Sea. During the Paleozoic Era, beginning around 400 million years ago (mya), tectonic forces began the process of mountain building and appears to mark the first time the coast moved west into most of what is now California, and the ancestral Sierra Nevada mountains

were emplaced. During the Mesozoic Era between 245 to 65 mya, mountain building continued and the beginnings of the Coast Ranges were formed.

The Cenozoic Era, between 65 mya and the present, was marked with continued uplift, erosion and deposition. The Pacific plate became completely overridden by the North American plate forming the San Andreas Fault system, and in turn other faults. Volcanic activity became widespread in the Sierra Nevada and Mojave Desert regions, and a number of deep marine basins formed along the central and southern California coast. About 5 mya, mountain building accelerated resulting in the uplifting of most of the modern mountain ranges, including the Sierra Nevada and the large fault-block ranges to the east, the Coast Ranges, the Transverse Ranges, and the Peninsular Ranges. This was followed by Pleistocene glaciations in the Sierra Nevada and, to a minor extent, in the San Bernardino Mountains; recent volcanic eruptions in the Mojave Desert and Great Basin regions; and the widespread volcanic activity that created the southern Cascade volcanoes (Mt. Shasta and Mt. Lassen) and the lava flows of the Modoc Plateau region.

2. Regulatory Setting

Applicable laws and regulations associated with soils, geology, and mineral resources are discussed in Table 3.G-1.

Table 3.G-1. Applicable Laws and Regulations for Geology and Soils

Federal	
Clean Water Act	This law was enacted to restore and maintain the chemical, physical, and biological integrity of the nation's waters by regulating point and nonpoint pollution sources, providing assistance to 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 a Storm Water Pollution Prevention Plan (SWPPP). In California, the State's NPDES permit program is implemented and administered by the local Regional Water Quality Control Boards.
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.
State	
Alquist-Priolo Earthquake Fault Zoning Act, Public Resources Code (PRC), Section 2621–2630.	The Alquist-Priolo Earthquake Fault Zoning Act of 1972 (formerly the Special Studies Zoning Act) regulates development and construction of buildings intended for human occupancy to avoid the hazard of surface fault rupture. This act mitigates against surface fault rupture of known active faults beneath occupied structures, and requires disclosure to potential buyers of existing real estate and a 50-foot setback for new occupied buildings. This act groups faults into categories of active, potentially active, and inactive.

Table 3.G-1. Applicable Laws and Regulations for Geology and Soils	
Seismic Hazards Mapping Act, PRC Section 2690–2699.	The Seismic Hazards Mapping Act (the Act) of 1990 (Public Resources Code, Chapter 7.8, Division 2) directs the California Department of Conservation, Division of Mines and Geology (now called California Geological Survey) 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.
California Division of Oil, Gas, and Geothermal Resources, PRC Section 3106.	Public Resources Code Section 3106 mandates the supervision of drilling, operation, maintenance, and abandonment of oil wells for the purpose of 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 California Division of Oil, Gas, and Geothermal Resources (DOGGR) regulate drilling, production, injection, and gas storage operations in accordance with California Code of Regulations (CCR) Title 14, Chapter 4, Subchapter 1.
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 Public Resources Code 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) (CCR Title 24)	California's minimum standards for structural design and construction are given in the California Building Standards Code (CBSC) (CCR Title 24). The CBSC is based on the Uniform Building Code (International Code Council 1997), which is used widely throughout United States (generally adopted on a state-by-state or district-by-district basis) and has been modified for California conditions with numerous, more detailed or more stringent regulations. The CBSC 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.
Caltrans Seismic Design Criteria	The California Department of Transportation (Caltrans) has Seismic Design Criteria (SDC), which is an encyclopedia of new and currently practiced seismic design and analysis methodologies for the design of new bridges in California. The SDC adopts a performance-based approach specifying minimum levels of structural system performance, component performance, analysis, and design practices for ordinary standard bridges. The SDC has been developed with input from the Caltrans Offices of Structure Design, Earthquake Engineering and Design Support, and Materials and Foundations. Memo 20-1 outlines the bridge category and classification, seismic performance criteria, seismic design philosophy and approach, seismic demands and capacities on structural components and seismic design practices that collectively make up Caltrans' seismic design methodology.

Table 3.G-1. Applicable Laws and Regulations for Geology and Soils	
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 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.
County General Plans (and EIR)	Some county General Plans provide a regulatory framework to address potential environmental impacts that may result from a proposed project. These include the General Plans for Solano, San Luis Obispo, Los Angeles, Kern, San Bernardino, Riverside, and Imperial counties.

H. Hazards and Hazardous Materials

1. Existing Conditions

Hazardous materials are substances with physical and chemical properties that could pose a substantial present or future hazard to human health or the environment when improperly handled, disposed, or otherwise managed. Hazardous materials are grouped into four categories based on their characteristics: toxic (causes human health effects), ignitable (has the ability to burn), corrosive (causes severe burns or damage to materials) and reactive (causes explosions or generates toxic gases). A hazardous waste is any hazardous material that is finished with its intended use and is discarded. 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 provides the following means to determine whether or not a waste is hazardous: (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 (RCRA and mercury-containing); and (3) a list of chemical names and common names that are presumed to be hazardous in California.

2. Regulatory Setting

Table 3.H-1. Applicable Laws and Regulations for Hazards and Hazardous Materials	
Federal	
Clean Air Act (CAA) Act (42 USC Section 9601 et seq.)	The Clean Air Act is the law that defines U.S. EPA's responsibilities for protecting and improving the nation's air quality and the stratospheric ozone layer. The last major change in the law, the Clean Air Act Amendments of 1990, was enacted by Congress in 1990. Legislation passed since then has made several minor changes. The Clean Air Act, like other laws enacted by Congress, was incorporated into the United States Code as Title 42, Chapter 85. The House of Representatives maintains a current version of the U.S. Code, which includes Clean Air Act changes enacted since 1990.
Clean Water Act (CWA) (40CFR 112)	The 1972 amendments to the Federal Water Pollution Control Act (known as the Clean Water Act or 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 United States. Section 402 of the CWA specifically required U.S. EPA to develop and implement the NPDES program.
Safe Drinking Water Act (SDWA)	The Safe Drinking Water Act (SDWA) is the main federal law that ensures the quality of Americans' drinking water. Under SDWA, U.S. EPA sets standards for drinking water quality and oversees the states, localities, and water suppliers who implement those standards. 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. SDWA does not regulate private wells which serve fewer than 25 individuals.
Federal Hazardous Materials Regulations (FHMR) Title 49, Code of Federal Regulations, 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 U.S.C. Section 2601 et seq.	The Toxic Substances Control Act (TSCA) of 1976 provides U.S. EPA with authority to require reporting, record-keeping and testing requirements, and restrictions relating to chemical substances and/or mixtures. TSCA addresses the production, importation, use, and disposal of specific chemicals including polychlorinated biphenyls (PCBs), asbestos, radon and lead-based paint.

Table 3.H-1. Applicable Laws and Regulations for Hazards and Hazardous Materials	
Resource Conservation and Recovery Act (RCRA) 42 U.S.C. Section 6901 et seq. Title 40, Code of Federal Regulations (CFR)	The Resource Conservation and Recovery Act (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. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled U.S. EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. HSWA - the Federal Hazardous and Solid Waste Amendments - are the 1984 amendments to 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 Title 40, Code of Federal Regulations (40 CFR).
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)	The Comprehensive Environmental Response, Compensation, and Liability Act (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. 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 NPL. The Superfund Amendments and Reauthorization Act (SARA) of 1986 reauthorized 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 SARA authorized the Emergency Planning and Community Right-to-Know Act (EPCRA).
Emergency Planning and Community Right-to-Know Act (EPCRA) (42 USC Section 9601 et seq.)	The Superfund Amendments and Reauthorization Act (SARA) of 1986 created EPCRA (40 CFR Parts 350-372), also known as 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. EPCRA required the establishment of state/tribe emergency response commissions (SERCs/TERCs), responsible for coordinating certain emergency response activities and for appointing local emergency planning committees (LEPCs).

Table 3.H-1. Applicable Laws and Regulations for Hazards and Hazardous Materials	
State	
Various California Air Pollution Control Laws (i.e., Bluebook)	Includes all relevant Health and Safety Code sections of law, plus those air pollution- related statutes from other California codes, and the California Code of Regulations (CCR) Titles 13 & 17 sections that pertain to ARB's air management program.
Hazardous Materials Transportation California Vehicle Code Sections 31301-31309	Regulations pertaining to the safe transport of hazardous materials are in California 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 (CHP). 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 CHP.
Hazardous Waste Control Law California Health & Safety Code, Division 20, Chapter 6.5 CCR, Division 4.5, Title 22	California requirements and statutory responsibilities in managing hazardous waste in California – this includes the generation, transportation, storage, treatment, recycling, and disposal of hazardous waste. The statute and regulation are implemented by Cal/EPA DTSC.
CalARP Program CCR, Title 19, 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 CCR, Title 19, 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 accidently 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. CUPAs use information collected from the Business Plan and California Accidental Release Prevention (CalARP) programs to identify hazardous materials in their communities. This information

Table 3.H-1. Applicable Laws and Regulations for Hazards and Hazardous Materials	
	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 CCR, Title 27, Division 1, Subdivision 4, Chapter 1, Sections 15100-15620	A CUPA is a Certified Unified Program Agency, which is authorized by the Secretary of Cal/EPA to carry out several of the hazardous waste/hazardous materials regulatory programs administered by the State in a coordinated and consistent manner. The 6 hazardous waste and materials program elements covered by the CUPA include: 1) Hazardous Waste Generators 2) Underground Tanks (UST) 3) Above Ground Tanks (AST) 4) Accidental Release Program (CalARP) 5) Hazardous Material Release Response Plans & Spill Notification (Community Right- to-Know) 6) Hazardous Materials Management Plans & Inventory Reporting 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.
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.

I. Hydrology and Water Quality

1. Existing Conditions

a. Water Supply

California experiences a Mediterranean climate with cool, wet winters and warm, dry summers. Most precipitation (i.e., rain and snow) and peak stream runoff events occur primarily during October through April, and the most extreme events usually occur between November and March. Precipitation rates vary greatly across the State from northern to southern regions, and the State contains many desert regions where annual total precipitation is very low (i.e., less than about 6 inches). In mountainous areas, snowmelt can provide moderate to high runoff rates in the April to July period, and snowmelt generally contributes substantially to the seasonal and annual volume of water that is available for storage in reservoirs and sustained stream flows into the later summer months.

Many rivers are controlled by dams, reservoirs, and levees for a variety of purposes, including but not limited to, flood control, hydroelectric power generation, water storage and transport for municipal/domestic and agricultural water supply, recreation, and fish

and wildlife uses. Most of the major rivers on the west side of the Sierra Nevada Mountains are controlled, to some degree, by large dams, reservoirs, and diversions and water conveyance canals. Smaller reservoirs are common at other locations throughout the State. Sierra Nevada Mountain runoff to the Sacramento River and San Joaquin River (i.e., approximately 25 million acre-feet [MAF] in above normal water year types) provides much of the surface water used in the State and managed and conveyed in State Water Project (SWP) and Central Valley Project (CVP) facilities operated by the California Department of Water Resources (DWR) and U.S. Bureau of Reclamation (U.S. BR), respectively (DWR 2011; USBR 2011b). Water from the Sacramento River and San Joaquin River flows into the Sacramento-San Joaquin Delta (Delta), where both the SWP and CVP operate pumps to export water to the southern portion of the State. California also conveys a substantial quantity of water from the Colorado River for agricultural uses in the Imperial Valley and Coachella Valley, and municipal uses in the Los Angeles region. Several large reservoirs are located in the Los Angeles and San Diego areas to store imported Delta and Colorado River water.

California contains vast quantities of groundwater in alluvial aquifers that cover approximately 40 percent of the land surface. Several large groundwater recharge and conjunctive use projects are part of the SWP/CVP operations to provide short-term and long-term sub-surface storage of surplus surface water for later withdrawal for municipal/agricultural uses. Groundwater pumping that exceeds the natural recharge can lead to “overdrafting”, which refers to long-term drawdown of groundwater table elevations.

Both groundwater and surface water are used extensively in California for agricultural, municipal, and industrial water supplies. Current annual municipal and industrial water use for the California population of approximately 35 million residents ranges from 10-12 MAF, with demands being lower in drought years when higher levels of conservation occur. Approximately 35 MAF is used for agricultural production. In years with average available surface water supply, groundwater meets about 30 percent of California’s urban and agricultural demand, increasing in drought years to about 40 percent or more. While water supplies typically have been sufficient to meet demands, significant water supply and water quality challenges exist at local levels, particularly during extreme drought year types when conservation and cutbacks for agriculture have occurred and the SWP/CVP operations are stressed to meet competing water demands and environmental requirements in the major rivers and Delta.

b. Water Quality

The water quality of surface waters and groundwater varies throughout California. Potential surface sources of water quality impairments include point sources (direct discharges to water bodies) and dispersed non-point sources (e.g., stormwater runoff). Continuous point-source discharges such as domestic wastewater treatment plants can be a source of elevated levels of organic carbon, nutrients (i.e., nitrogen and phosphorus), salinity, or trace metals and organic compounds relative to natural background water concentrations. Potential domestic wastewater discharges of pharmaceutical and other personal care products have been identified as potentially

contributing endocrine disrupting compounds (EDCs) and related adverse long-term toxic effects to aquatic organisms. Urban stormwater runoff from residential, commercial, and industrial land uses can mobilize and convey trash, oils, grease, trace metals (e.g., copper and zinc) to drainage systems and natural receiving water bodies. Stormwater runoff from residential and agricultural areas can also contain sediment, pesticides, herbicides, nutrients (e.g., fertilizers), and pathogens (e.g., bacteria and viruses from fecal wastes of pets and livestock). Contaminants of concern that remain in the environment for an extended period after deposition with little degradation include synthetic organic compounds such as chlorinated hydrocarbon pesticides (e.g., dichlorodiphenyltrichloroethane [DDT]), which largely have not been produced or used in California since the late 1970's, polychlorinated biphenyl compounds (PCBs), and dioxin and furan compounds. Improperly managed construction activities-related erosion and stormwater runoff can contribute sediment.

Primary water quality issues vary around the State depending on the location and type of water resources present in an area, the size and extent of the watershed and regional water resources, the location of the water body with respect to potential pollutant sources, seasonal and climatic factors, and many other interacting physical, chemical, and biological processes. The State Water Resources Control Board (SWRCB) conducts monitoring of surface waters through the Surface Water Ambient Monitoring Program (SWAMP), in which the collected data is used in part to support water quality assessments by each Regional Water Quality Control Board for the Clean Water Act (CWA) Section 305(b) reporting process, which mandates the State to identify and prioritize funding efforts for protection, cleanup, and monitoring programs. The most recent Section 305(b) report released in 2002 identified that of the 32,536 miles of rivers/streams assessed, 27,449 were impaired for one or more beneficial uses, as was 361,128 of 576,013 acres of lakes/reservoirs assessed (SWRCB 2003).

Groundwater quality may be adversely affected by all of the sources contributing to surface water impairment discussed above, particularly in alluvial aquifers that are recharged directly through by infiltration and percolation of surface water. Direct inputs of wastes to groundwater include sub-surface sources such as inadequately contained solid waste landfills, failing residential and commercial septic system leachfields, and leaking underground storage tanks that contain fuels, oils, or other industrial chemicals. The level of the major dissolved minerals (e.g., calcium, magnesium, potassium, sodium, sulfate, chloride), or salinity, is an important groundwater quality parameter for drinking water acceptability, agricultural use (i.e., crop tolerance), and aquatic biota. Total dissolved solids (TDS) concentrations that exceed about 500 milligrams per liter (mg/L) reflect generally low salinity, whereas water with TDS levels above about 2,500 mg/L are undesirable for drinking and have severe limitations for agricultural irrigation. Salinity can be naturally high, such as coastal aquifers affected by seawater intrusion or in arid lands where eons of evaporative concentration and locations of prehistoric seas have raised salinity levels.

2. Regulatory Setting

Table 3.I-1 below provides a general description of applicable laws and regulations that may pertain to the Proposed ACC Program as it relates to hydrology, water quality, and water supply.

Table 3.I-1. Applicable Laws and Regulations for Hydrology, Water Quality, and Supply

Applicable Regulation	Description
Federal	
National Flood Insurance Program	Designated floodplain mapping program, flooding and flood hazard reduction implementation, and federal subsidized flood insurance for residential and commercial property. Administered by the Federal Emergency Management Agency (FEMA).
Executive Order 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.
Clean Water Act (CWA)	Administered primarily by the U.S. Environmental Protection Agency (U.S. EPA). Pertains to water quality standards, state responsibilities, and discharges of waste to waters of the United States. 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	National Pollutant Discharge Elimination System (NPDES) permit program to control discharges of pollutants from point sources and nonpoint source stormwater. 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

Table 3.I-1. Applicable Laws and Regulations for Hydrology, Water Quality, and Supply

Applicable Regulation	Description
	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 the U.S. Army Corps of Engineers.
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	The State Water Resources Control Board (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 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 and California Water Code (Title 23)	The 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 Regional Water Quality Control Boards (Regional Water Boards) 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. Regional Water Boards issue waste discharge requirements (WDRs) 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 Public Health (drinking water regulations), Department of Pesticide Regulation, Department of Toxic Substances Control, Department of Fish and Game, and the Office of Environmental Health and Hazard Assessment.

Table 3.I-1. Applicable Laws and Regulations for Hydrology, Water Quality, and Supply

Applicable Regulation	Description
Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California	Commonly referred to as the State Implementation Policy (or SIP), the SIP 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 the 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 1ºF over more than 25 percent of a stream cross section, increasing ambient temperatures by more than 4ºF in any location, and prohibits discharge of waste that exceeds more than 20ºF 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 one acre. The general construction permit requires the preparation of a storm water pollution prevention plan (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, the RWQCB has 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 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 (SIC). The general industrial permit requires the preparation of a SWPPP that identifies potential onsite pollutants, BMPs to be implemented, and inspection/monitoring.
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

Table 3.I-1. Applicable Laws and Regulations for Hydrology, Water Quality, and Supply	
Applicable Regulation	**Description**
	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 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	The Regional Water Boards 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 leachfields, cesspools).

J. Land Use and Planning

1. Existing Conditions

The manner in which physical landscapes are used or developed is commonly referred to as land use. Local governments possess the basic legal authority to control land use, which is part of the police powers to protect community health, safety, and welfare conferred to state governments under the U. S. Constitution and, in turn, delegated by the state to local governments. Cities and counties are the primary entities that determine the types of land use changes that can occur for specific purposes within their jurisdiction, as well as development standards for structures and other development on the land. In incorporated areas, land use decisions are made by the city. In unincorporated areas, land use decisions are made by the county. Sometimes other public agencies have land use authority, either by virtue of land ownership by agencies with sovereignty over local government, such as state or federal land management agencies, or because of other state or federal laws, such as the California Coastal Commission in the coastal zone or the State Lands Commission in submerged and other land held in trust for the public.

In California, the State Planning and Zoning Law (California 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 the California Environmental Quality Act (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.

2. Regulatory Setting

Table 3.J-1 below provides a general description of applicable laws and regulations that may pertain to land use planning and the Proposed ACC Program.

Table 3.J-1. Applicable Laws and Regulations for Land Use Planning

Applicable Regulation	Description
Federal	
Federal Land Policy Management Act	The Federal Land Policy Management Act of 1976 (FLPMA) is the principal law governing how the BLM manages public lands. FLPMA requires the BLM to manage public land resources for multiple use and sustained yield for both present and future generations. Under FLPMA, the BLM is authorized to grant right-of-ways (ROWs) for generation, transmission, and distribution of electrical energy. Although local agencies do not have jurisdiction over the federal lands managed by the BLM, under FLPMA and the BLM regulations at 43 CFR Part 1600, the 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. The 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.

Table 3.J-1. Applicable Laws and Regulations for Land Use Planning

Applicable Regulation	Description
U.S. Bureau of Land Management Resource Management Plans	Established by FLPMA, Resource Management Plans 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 Resource Management Plans. Management direction is set forth in the Resource Management Plans 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.
State	
State Planning and Zoning Law	California 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.).
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).

Table 3.J-1. Applicable Laws and Regulations for Land Use Planning

Applicable Regulation	Description
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 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.
Housing Element Law	State law requires each city and county to adopt a general plan containing at least seven mandatory elements including housing. Unlike the other general plan elements, the housing element, required to be updated every five to six years, is subject to detailed statutory requirements and mandatory review by a State agency, the California Department of Housing and Community Development (Department). Housing elements have been mandatory portions of local general plans since 1969. This reflects the statutory recognition that housing is a matter of statewide importance and cooperation between government and the private sector is critical to attainment of the State's housing goals. The availability of an adequate supply of housing affordable to workers, families, and seniors is critical to the State's long-term economic competitiveness and the quality of life for all Californians.

K. Mineral Resources

1. Existing Conditions

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.

The California Geological Survey (CGS), formerly the California Division of Mines and Geology, classifies the regional significance of mineral resources in accordance with the California Surface Mining and Reclamation Act of 1975 and assists the CGS in the designation of lands containing significant aggregate resources. Mineral Resource Zones (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.

Lithium and platinum are discussed below, as such relate to the proposed ACC Program.

a. Lithium Mining

i. Basic Processes

Lithium is an elemental metal that is necessary component of lithium-ion batteries. More vehicle manufacturers are considering the use of lithium-ion batteries in their battery electric vehicle (BEV) and hybrid plug-in vehicle models instead of nickel-metal hydride batteries (USGS 2011).

Lithium production comes from deposits in which the lithium has been concentrated above background crustal abundance by natural processes. Lithium deposits are found in brine, which is extracted from wells that penetrate lithium-bearing zones of sediment (e.g., aquifers) and pumped into shallow evaporation ponds, where it is evaporated under controlled conditions that eliminate deleterious elements and compounds, principally magnesium and sulfate (Gruber et al. 2011).

ii. Number of Facilities in California

There are no lithium mines in California. The only commercial lithium brine operation in the U.S. is operated by American Lithium Minerals, Inc. in western Nevada (American Lithium Inc. 2010; USGS 2011). Other nations that are substantial lithium producers include Chile, Argentina, Canada, Bolivia, and China.

a. Platinum Mining

i. Basic Processes

Platinum is a vital component of proton exchange membrane fuel cells, which is the leading type of fuel cell that would be used in fuel cell vehicles (FCVs). The mining of platinum starts with finding an ore body containing (PGM), usually associated with copper and nickel ores. The ore is attained through a combination of digging, drilling, and blasting, and then hauled by a haul dump vehicle to a refining facility.

ii. Number of Facilities in California

There are no platinum mines in California. The only primary platinum-group metal (PGM) mines in the U.S. are the Stillwater and East Boulder Mines in Montana (USGS 2011). Small quantities of PGMs were also recovered as byproducts of copper refining. South Africa, Russia, and Canada are the world's leading producers of platinum.

2. Regulatory Setting

Applicable laws and regulations associated with mineral resources are discussed in Table 3.K-1.

Table 3.K-1. Applicable Laws and Regulations for Mineral Resources

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.
State	
Surface Mining and Reclamation Act (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 Mineral Resource Zones (MRZ) 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.
California Building Standards Code (CBSC) (CCR Title 24)	California's minimum standards for structural design and construction are given in the California Building Standards Code (CBSC) (CCR Title 24). The CBSC is based on the Uniform Building Code (International Code Council 1997), which is used widely throughout United States (generally adopted on a state-by-state or district-by-district basis) and has been modified for California conditions with numerous, more detailed or more stringent regulations. The CBSC 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.

Table 3.K-1. Applicable Laws and Regulations for 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.
County General Plans (and EIR)	Some county General Plans provide a regulatory framework to address potential environmental impacts that may result from a proposed project

L. Noise

1. Existing Conditions

a. Acoustic Fundamentals

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; consequently, the perception of sound is subjective in nature, and can vary substantially from person to person.

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 decibel (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 added. 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 environmental analysis are A-weighted sound levels, unless noted otherwise.

Noise can be generated by a number of sources, including mobile sources (transportation noise sources), such as automobiles, trucks, and airplanes and stationary sources (nontransportation noise sources), 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 (decrease) depending on ground absorption characteristics, atmospheric conditions, and the presence of physical barriers (walls, building façades, berms). 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 or “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 barriers such as berms, hills, or dense woods, and human-made features such as buildings and walls may be used as noise barriers.

b. 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 used to describe environmental noise are defined below.

- **Equivalent Noise Level (L_{eq}):** The energy mean (average) noise level.
- **Maximum Noise Level (L_{max}):** The highest A/B/C weighted integrated noise level occurring during a specific period of time.

- **Minimum Noise Level (L_{min}):** The lowest A/B/C weighted integrated noise level during a specific period of time.

- **Day-Night Noise Level (L_{dn}):** The 24-hour Leq with a 10-dB "penalty" applied during nighttime noise-sensitive hours, 10 p.m. through 7 a.m.

- **Community Noise Equivalent Level (CNEL):** Similar to the Ldn described above, but with an additional 5-dB "penalty" for the noise-sensitive hours between 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 Leq 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.

c. 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 accustom 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 1988). These subjective reactions to changes in noise levels was developed on the basis of 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.

d. 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 (Federal Transit Administration [FTA] 2006, California Department of Transportation [Caltrans] 2004). 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. The response of the human body to vibration relates well to average vibration amplitude; therefore, vibration impacts on humans are evaluated in terms of RMS vibration velocity. Similar to airborne sound, vibration velocity can be expressed in decibel notation as vibration decibels (VdB). The logarithmic nature of the decibel serves to compress the broad range of numbers required to describe vibration.

Typical outdoor sources of perceptible groundborne vibration include construction equipment, steel-wheeled trains, and traffic on rough roads. Although the effects of vibration may be imperceptible at low levels, effects may result in detectable vibrations and slight damage to nearby structures at moderate and high levels, respectively. At the highest levels of vibration, damage to structures is primarily architectural (e.g., loosening and cracking of plaster or stucco coatings) and rarely results in damage to structural components. The range of vibration that is relevant to this analysis occurs 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 (FTA 2006).

e. Existing Sources and Sensitive Land Uses

The existing noise environment in most urban areas of California area is primarily influenced by transportation noise from vehicle traffic on the roadway systems (e.g., highways, freeways, primary arterials, and major local streets) and non-transportation noise from commercial and industrial operations. Other noise sources that contribute to the existing noise environment include passenger and freight on-line railroad operations and ground rapid transit systems; commercial, general aviation, heliport, and military airport operations (e.g., jet engine test stands, ground facilities and maintenance) and overflights; and to a much lesser extent construction sites, schools (i.e., play fields), residential and recreational areas (e.g., landscape maintenance activities, dogs barking, people talking), agricultural activities, and others. Those noted above are also considered sources of vibration in the project area. With regards to the affected entities, existing noise conditions vary depending on location, but are typically characterized as noisy urban industrial areas including such noise sources as stationary machinery, transportation (e.g., surface vehicles, heavy-duty diesel trucks, construction equipment), and other industrial-related activities. Table 3.L-1 shows typical ambient noise levels based on population density.

Table 3.L-1. Population Density and Associated Ambient Noise Levels

	dBA, L_{dn}
Rural	40-50
Suburban	
Quiet suburban residential or small town	45-50
Normal suburban residential	50-55
Urban	
Normal urban residential	60
Noisy urban residential	65
Very noise urban residential	70
Downtown, major metropolis	75-80
Under flight path at major airport, ½ to 1 mile from runway	78-85
Adjoining freeway or near a major airport	80-90

Notes: A-Weighted Decibel (dBA). An overall frequency-weighted sound level in decibels which approximates the frequency response of the human ear. Day-Night Level (Ldn).
Sources: Cowan, James P. 1994

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

Those noted above 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. Equipment such as electron microscopes and high-resolution lithographic equipment can be very sensitive to vibration, and even normal optical microscopes will sometimes be difficult to use when vibration is well below the human annoyance level. Manufacturing of computer chips is an example of a vibration-sensitive process. This category does not include most computer installations or telephone switching equipment because most such equipment is designed to operate in typical building environments where the equipment may experience occasional shock from bumping and continuous background vibration caused by other equipment (FTA 2006).

2. Regulatory Setting

The following provides a brief description of the Federal and State noise regulations that could be applicable to the ACC Program. Local regulations may also apply; however, because the specific siting of new hydrogen fueling stations automotive production facilities is not known at this time it would be speculative to present a discussion of applicable local regulations.

Table 3.L-2. Applicable Laws and Regulations for Noise Resources

Regulation	Description
Federal	
Federal Noise Control Act (1972) (U.S. Environmental Protection Agency [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.
24 CFR, Part 51B (U.S. Department of Housing and Urban Development [HUD])	This regulation established standards for HUD-assisted projects and actions, requirements, and guidelines on noise abatement and control.

Table 3.L-2. Applicable Laws and Regulations for Noise Resources	
Regulation	**Description**
Federal Aviation Administration (FAA) Order 1050.1D	This order contains policies and procedures for considering environmental impacts.
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	These 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 [OSHA])	This regulation established a standard for noise exposure in the workplace.
Federal Transit Administration (FTA) Guidance (2006)	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.

Table 3.L-2. Applicable Laws and Regulations for Noise Resources	
Regulation	**Description**
State	
California Public Utilities Code (CPUC) Section 21670	The State Aeronautics Act of the CPUC establishes statewide requirements for airport land use compatibility planning and requires nearly every county to create an Airport Land Use Commission (ALUC) or other alternative.
Section 5000 et seq. (CCR, Title 21, Division 2.5, Chapter 6), California Airport Noise Regulations promulgated in accordance with the State Aeronautics Act	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.
California Streets and Highways Code Section 216 (Freeway Noise in Classrooms)	This section, known as the Control of Freeway Noise in School Classrooms, requires that, in general, Caltrans abate noise from freeways to specified levels when the noise exceeds specified levels in school classrooms
California Government Code Section 65302 (Provision of Noise Contour Maps)	This section requires Caltrans to provide cities and counties with noise contour maps along State highways.
Title 24, Part 2, California Code of Regulations	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.

M. Employment, Population, and Housing

1. Existing Conditions

The employed civilian labor force, unemployment rates, employment opportunities, and population estimates and projections for cities, counties, and states are collected every ten years by the U.S. Census Bureau (Census). The California Employment Development Department (EDD) collects statistics specific to California annually.

Population data for the State of California is collected during the ten year census cycles conducted by the United States Census Bureau. The 2010 Census shows California's total population at 37,253,956 individuals. Minors (9,295,040 individuals, under age 18) account for approximately 25 percent of the population, while adults (27,958,916 individuals, over age 18) account for approximately 75 percent of the population. Senior citizens (4,246,514 individuals, over age 65) account for approximately 15 percent of the adult population or 11 percent of the State's total population (U.S. Census Bureau 2010).

The State of California, Department of Finance (DOF) provides population projections after each ten year census cycle once the Census Bureau releases its Modified Age, Race, and Sex data. For the 2010 Census this data is not expected to be available until 2012. The current DOF projections are based on the 2000 Census and provide population projects in ten year increments through 2050. These projections show California's rate of population growth is expected to decline over time, as follows (DOF 2007):

- From 2000 to 2010: Population growth of approximately 14.7 percent (to 39,135,676)
- From 2010 to 2020: Population growth of approximately 12.8 percent (to 44,135,923)
- From 2020 to 2030: Population growth of approximately 11.6 percent (to 49,240,891)
- From 2030 to 2040: Population growth of approximately 10.1 percent (to 54,226,115)
- From 2040 to 2050: Population growth of approximately 9.7 percent (to 59,507,876)

Based on the 2010 Census, the actual rate of growth from 2000 to 2010 was approximately 9.2 percent, from 34,105,437 (DOF 2007) to 37,253,956 (U.S. Census Bureau 2010).

Current and projected employment data for the State of California is estimated by the State of California Employment Development Department (EDD). Total civilian employment in the State in during 2010 was 15,963,300 individuals (EDD 2011b). The EDD produces short-term (two year) projections of employment annually and long-term (ten year) projections of employment every two years. The current short-term (2010-2012) projections estimate that California's total occupational employment is expected to grow by 3.3 percent during that time (a net increase of 523,600 new jobs) and will reach 16.3 million jobs by the third quarter of 2012 (EDD 2011a). The long-term projections (2008-2018) estimate that California's occupational employment is expected to add over 1.6 million jobs during that decade to reach approximately 18.6 million jobs by 2018 (EDD 2010).

2. Regulatory Setting

Federal and state laws do not control population and employment. See housing-related regulations in Section J, Land Use and Planning.

N. Public Services

1. Existing Conditions

a. Law Enforcement

The U.S. Environmental Protection Agency (U.S. EPA) is an agency of the federal government of the United States charged with protecting human health and the environment, by writing and enforcing regulations based on laws passed by Congress. The Environmental Protection Agency's Criminal Investigation Division (U.S. EPA CID) primary mission is the enforcement of the United States' environmental laws as well as any other federal law in accordance with the guidelines established by the Attorney General of the United States (18 U.S.C. 3063). These environmental laws include those specifically related to air, water and land resources.

Statewide law enforcement service is provided by the California Highway Patrol (CHP). The CHP is responsible for protecting State resources and providing crime prevention services and traffic enforcement along the State's highways and byways.

Enforcement of environmental laws in California is the responsibility of the AG's Office and Cal/EPA. 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 United States. In regards to 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: legally defending the State's clean cars law against multiple challenges, filing numerous actions against the Bush Administration regarding regulation of global warming pollution, 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 (DOJ 2011).

The California Environmental Protection Agency (Cal/EPA) was created in 1991 by Governor's Executive Order. Cal/EPA's mission is to restore, protect and enhance the environment, to ensure public health, environmental quality and economic vitality (Cal/EPA 2011a). The Cal/EPA is comprised of various boards, departments and offices, including: Air Resources Board, Department of Pesticide Regulation, Department of Toxic Substances Control, Office of Environmental Health Hazard Assessment, and State Water Resources Control Board (including the nine Regional Water Quality Control Boards) (Cal/EPA 2011b).

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 (Cal/EPA 2011c). Enforcement agencies for these media are as follows:

- Air: Air Resources Board (part of Cal/EPA) and Local Air Districts.
- Water: State Water Resources Control Board (part of Cal/EPA), Regional Water Quality Control Boards (part of Cal/EPA), local waste water officials, and the California Department of Public Health.
- Hazardous Waste: Department of Toxic Substances Control (part of Cal/EPA) and Certified Unified Program Agencies (CUPA).
- Carcinogens/Reproductive Toxins: Prop. 65 through the Office of Environmental Health Hazard Assessment (part of Cal/EPA).
- Pesticides: Department of Pesticide Regulation (part of Cal/EPA) and County Agricultural Commissioners

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

The United States Forest Service is an agency of the United States Department of Agriculture that administers the nation's 155 national forests and 20 national grasslands, which encompass 193 million acres (780,000 km^2), 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 the US Forest Service 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 our Federal, State, and International fire partners.

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.

c. Schools

Education is primarily a state and local responsibility in the United States. States and communities, as well as public and private organizations, establish schools, develop curricula, and determine requirements for enrollment and graduation (U.S. Department of Education 2010). 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. The SBE sets K-12 education policy in the areas of standards, instructional materials, assessment, and accountability (California State Board of Education 2010).

Locally, school districts are responsible for the management and development of elementary, middle, and high-school facilities. Throughout California there are 1,039 school districts.

2. Regulatory Setting

Key regulations and polices applicable to law enforcement, fire protection and emergency medical response services, and schools for the proposed ACC Program are summarized in Table 3.N-1.

Table 3.N-1. Applicable Laws and Regulations for Public Services

Regulation	Description
Federal	None applicable.
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 the State of California, Department of Forestry and Fire Protection (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.

O. Recreation

1. Existing Conditions

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 in California 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 trials, and marine reserves and estuaries. The U.S. Fish and Wildlife Service (USFWS) manages the wildlife and fisheries resources and their habitats. Each federal agency's programs include recreation components.

California has over 275 State beaches and parks, recreation areas, wildlife areas, historic parks, and museums, and has authority over fishing and hunting activities, habitat restoration and protection in the State. General plans for State parks, recreation areas, and beaches are publicly available. 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 have involvement in recreational activities include Boating and Waterways, Fish and Game, Tahoe Regional Planning Association, various conservancies, and others (California State Parks 2008, p. 3).

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.

2. Regulatory Setting

The following provides a brief description of the Federal and State regulations that could be applicable to a new or renovated vehicle production facilities or fueling stations. Local regulations may also apply; however, because the specific siting of new is not known at this time it would be speculative to present a discussion of applicable local regulations.

Table 3.O-1. Applicable Laws and Regulations for Recreation	
Law or Regulation	**Description**
Federal	
Federal Land Policy and Management Act (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 (FLPMA 2001).
State	None applicable
Local	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.

P. Transportation and Traffic

1. Existing Conditions

Existing roadway systems in the project area 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).

2. Regulatory Setting

Key regulations and polices applicable to utilities for the proposed ACC Program are summarized in Table 3.P-1. See Table 3.D-1 for a description of SB 375.

Table 3.P-1. Applicable Laws and Regulations for Transportation and Traffic

Regulation	Description
Federal	
40 CFR, Part 77 (Federal Aviation Administration)	Requires a determination of no hazard to air navigation for structures that will be more than 200 feet above ground level.
State	
California Vehicle Code (VC) Sections 353; 2500-2505; 31303-31309; 32000-32053; 32100-32109; 31600-31620; California Health and Safety Code Section 25160 et seq.	These regulate the highway transport of hazardous materials.
VC Sections 13369; 15275 and 15278	These address 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.
VC Sections 35100 et seq.; 35250 et seq.; 35400 et seq.	These specify limits for vehicle width, height, and length.
VC Section 35780	This requires permits for any load exceeding Caltrans weight, length, or width standards on public roadways.
California Streets and Highways Code Section 117, 660-672	This 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.	These regulate permits from Caltrans for any roadway encroachment from facilities that require construction, maintenance, or repairs on or across State highways and County roads.

Q. Utilities and Service Systems

1. Existing Conditions

a. Water Supply and Distribution

The principal water supply facilities in California are operated by the USBR and DWR. The 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 2011a). In California, the Mid-Pacific Region of the 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 2011b).

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 2010).

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 land use authority and seek approval for development of the groundwater well(s).

b. Wastewater Collection and Treatment

The California State Water Resources Control Board (SWRCB) is the State agency responsible for the regulation of wastewater discharges to surface waters and groundwater via land discharge. The SWRCB and nine regional water quality control boards (RWQCB) 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 2010). The State water board 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 land use authority and the RWQCB.

c. Electricity and Natural Gas

The California Public Utilities Commission (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. One-third of California's electricity and natural gas is provided by one of three companies: Pacific Gas and Electric Company, Southern California Edison, San Diego Gas and Electric Company (CPUC 2010).

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 (CAL Recycle), which is a department of the California Natural Resources Agency (CNRA), is responsible for the regulation of the disposal and recycling of all solid waste generated in California. Cal Recycle acts as an enforcement agency in the approval and regulation of solid waste disposal and recycling facilities. Local agencies can create local enforcement agencies (LEA) and, once approved by Cal Recycle, they can serve as the enforcement agency for landfills and recycling facilities with their jurisdictions (Cal Recycle 2011).

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.

At this time, propulsion batteries are replaced at authorized original equipment manufacturer (OEM) service centers if needed. However, vehicle manufacturers differ in how they are addressing the need to properly handle or dispose of propulsion batteries after they reach the end of their useful life (e.g., recycling programs, switchable battery). Vehicle manufacturers have not provided specific information about how batteries would be handled after their "second life." A study at the National

Renewable Energy Laboratory concludes that if second uses for batteries are determined not to be economical then recycling them would be the next economically superior option (Neubauer and Pesaran 2011).

Federal and state agencies also regulate and/or research how automotive propulsion batteries should be handled at the end of their useful life. Regulations under the federal Resource Conservation and Recovery Act (RCRA) nickel-metal hydride batteries and lithium-ion batteries are classified as non-hazardous waste and are not required to be recycled. Per RCRA hazardous waste listings & criteria (40 CFR 261.4, Exclusions), fully spent consumer lithium batteries are neither toxic nor reactive and are considered non-hazardous (NEMA 2001).

California's hazardous waste management regulations classify all types of batteries, including nickel-metal hydride and lithium-ion batteries, as hazardous waste when discarded and must be managed accordingly. More specifically, facilities that treat, store, dispose and recycle batteries in California are also regulated under California's hazardous waste generator laws and regulations for Universal Waste (CCR, Title 22, Section 66261.9). These facilities are regulated and inspected by the California Department of Toxic Substances Control (DTSC), which is authorized by U.S. EPA to administer its own hazardous waste program for California. The local Certified Unified Program Agency (CUPA) is given authority to enforce hazardous waste management laws and regulations at the local level by the Secretary of Cal/EPA. Generators of universal wastes must recycle their waste by relinquishing it to the following: (1) a universal waste handler (e.g.; household hazardous waste facility, a 'Take-it-Back Partner' such as retailers or manufacturers); (2) a universal waste transporter; or (3) a destination facility (facility permitted by DTSC to treat, store, dispose or recycle).

2. Regulatory Setting

Key regulations and polices applicable to utilities for the proposed ACC Program are summarized in Table 3.Q-1.

Table 3.Q-1. Applicable Laws and Regulations for Public Services

Regulation	Description
Federal	None applicable.
State	
California Public Utilities Commission, Section 95-08-038	This section contains the rules for planning and construction of new transmission facilities, distribution facilities, and substations. The CPUC requires permits for the construction of certain power line facilities or substations if the voltages would exceed certain thresholds.

Table 3.Q-1. Applicable Laws and Regulations for Public Services

Regulation	Description
Section 21151.9 of the Public Resources Code/ Section 10910 et seq. of the Water Code	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-dray, and multiple-dry years. The WSA is required to be approved by the water service agency before the project can be implemented.

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4.0 REGULATED COMMUNITY COMPLIANCE RESPONSES

For LEV III and ZEV, the regulated community would be automobile manufacturers. For CFO, the regulated community would be major refineries and gasoline importers, which would be required to establish the required minimum number of CFO outlets. For the ACC program as a whole, fuel producers (e.g., hydrogen), electricity generators, and mining would also be affected indirectly.

Compliance responses are activities undertaken by regulated communities to comply with regulations. Compliance activities would change in response to regulatory amendments included in the proposed Advanced Clean Cars (ACC) Program. This Environmental Analysis (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 of the conceivable iterations of compliance responses that could occur within the passenger 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 ACC Program. Individual vehicle manufacturers or major refiners and importers of gasoline could choose other compliance responses that result in different project impacts. For the purposes of this EA, the least expensive compliance responses are generally expected to be implemented by covered industries as a whole, although the responses of individual regulated communities within affected industries may differ depending on relative compliance costs and other factors.

The following compliance responses have been identified as reasonably foreseeable actions and provide the basis for a reasoned, good-faith assessment of potential, significant environmental impacts of the regulatory amendments under the proposed ACC Program. The compliance responses associated with each component of the proposed ACC Program are discussed separately below.

A. Low-Emission Vehicle and Greenhouse Gas Regulation (LEV III)

1. Fleet Mix

The proposed LEV III requirements, particularly the fleet average standards, would affect the mix of vehicle models and types that manufacturers would sell and lease in California. Table 4-1 summarizes projections by ARB staff about how a full-line manufacturer (i.e., a company that markets both passenger cars and light-duty trucks) could meet the LEV III fleet average emission standards for ozone precursors (e.g., NMOG and NO_X). It is important to note that Table 4-1 provides an example of how a manufacturer could comply with the ozone precursor standards, but LEV III also addresses CAPs and GHGs, as discussed below.

Table 4-1. Projected Sales Mix of Light-Duty Vehicles to Achieve Compliance with LEV III Emission Standards

Year	Passenger Cars										Fleet Average Standard for Mix of NMOG+NO_X Emissions (g/mile)
	LEV 160	ULEV 125	ULEV 70	ULEV 50	SULEV 30	SULEV 20	PZEV	PHEV	BEV	FCV	
2015	5%	62%	8%	0%	0%	0%	21%	2%	1%	0%	0.100
2016	3%	50%	23%	0%	0%	0%	21%	2%	1%	0%	0.091
2017	3%	38%	35%	0%	0%	0%	21%	2%	1%	0%	0.084
2018	0%	25%	47%	0%	21%	0%	0%	6%	1%	0%	0.072
2019	0%	14%	55%	0%	21%	0%	0%	7%	3%	1%	0.064
2020	0%	2%	59%	0%	21%	5%	0%	8%	4%	1%	0.054
2021	0%	0%	31%	28%	21%	5%	0%	9%	5%	2%	0.046
2022	0%	0%	6%	45%	21%	10%	0%	10%	5%	2%	0.038
2023	0%	0%	5%	32%	33%	10%	0%	11%	6%	3%	0.035
2024	0%	0%	3%	15%	40%	20%	0%	13%	6%	3%	0.029
2025	0%	0%	0%	0%	55%	20%	0%	14%	6%	4%	0.025
Year	Light-Duty Truck 1 (0-3,750 lb LVW)										Fleet Average Standard for Mix of NMOG+NO_X Emissions (g/mile)
	LEV 160	ULEV 125	ULEV 70	ULEV 50	SULEV 30	SULEV 20	PZEV	PHEV	BEV	FCV	
2015	3%	69%	7%	0%	0%	0%	21%	0%	0%	0%	0.102
2016	3%	52%	24%	0%	0%	0%	21%	0%	0%	0%	0.093
2017	0%	44%	35%	0%	0%	0%	21%	0%	0%	0%	0.086
2018	0%	32%	47%	0%	21%	0%	0%	0%	0%	0%	0.079
2019	0%	20%	59%	0%	21%	0%	0%	0%	0%	0%	0.072
2020	0%	6%	68%	0%	21%	5%	0%	0%	0%	0%	0.062
2021	0%	0%	55%	19%	21%	5%	0%	0%	0%	0%	0.055
2022	0%	0%	11%	58%	21%	10%	0%	0%	0%	0%	0.045
2023	0%	0%	0%	51%	39%	10%	0%	0%	0%	0%	0.039
2024	0%	0%	0%	33%	47%	20%	0%	0%	0%	0%	0.035
2025	0%	0%	0%	0%	80%	20%	0%	0%	0%	0%	0.028

Table 4-1. Projected Sales Mix of Light-Duty Vehicles to Achieve Compliance with LEV III Emission Standards

Year	Light-Duty Truck 2 (3,751 lb LVW – 8,500 lb GVWR)										Fleet Average Standard for Mix of NMOG+NO_X Emissions (g/mile)
	LEV	ULEV	ULEV 70	ULEV 50	SULEV 30	SULEV 20	PZEV	PHEV	BEV	FCV	
2015	5%	81%	14%	0%	0%	0%	0%	0%	0%	0%	0.119
2016	5%	76%	19%	0%	0%	0%	0%	0%	0%	0%	0.116
2017	5%	53%	42%	0%	0%	0%	0%	0%	0%	0%	0.104
2018	5%	53%	42%	0%	0%	0%	0%	0%	0%	0%	0.104
2019	5%	42%	53%	0%	0%	0%	0%	0%	0%	0%	0.098
2020	5%	36%	59%	0%	0%	0%	0%	0%	0%	0%	0.095
2021	4%	24%	72%	0%	0%	0%	0%	0%	0%	0%	0.087
2022	4%	24%	45%	27%	0%	0%	0%	0%	0%	0%	0.081
2023	4%	5%	45%	30%	16%	0%	0%	0%	0%	0%	0.064
2024	3%	0%	20%	50%	27%	0%	0%	0%	0%	0%	0.052
2025	2%	0%	0%	25%	72%	0%	0%	0%	0%	0%	0.038

Notes: These projections reflect a reasonably representative approach for compliance with the LEV III requirements. Other compliance scenarios that would achieve the fleet average emission standards of the LEV III amendments are conceivable. ARB's projections are specifically based on how vehicle manufacturers would be expected to respond to the amended standards for criteria air pollutants and precursors of LEV III and do not reflect the amendments to greenhouse gas (GHG) standards of LEV III. These projections do not account for any potential changes in consumer preference regarding the class of vehicles consumers choose to purchase. Consumer preferences can change according to a number of factors, including changes in fuel costs.
LEV = Low-Emission Vehicle; LEV160 = certified to 0.160 g/mi NMOG plus NOx ; ULEV125 = certified to 0.125 g/mi NMOG plus NOx; ULEV = Ultra-Low-Emission Vehicle; ULEV 70 = certified to 0.070 g/mi NMOG plus NOx; ULEV 50 = certified to 0.050 g/mi NMOG plus NOx; SULEV 30 = certified to 0.030 g/mi NMOG plus NOx; SULEV 20 = certified to 0.020 g/mi NMOG plus NOx; PZEV = Partial Zero Emission Vehicle; PHEV = Plug-in Hybrid Electric Vehicle; BEV = Battery Electric Vehicle; FCV = Fuel Cell Vehicle.
Source: ARB (available in the Staff Report, Section II.A.2)

As shown in Table 4-1, a greater proportion of the vehicle fleet would consist of vehicles from the more stringent emission performance classes (i.e., ULEV 50, SULEV 30, and SULEV 20) in order for manufacturers to comply with the increasingly stringent fleet-average emission standards proposed by the amendments. Thus, because compliance would be based on this proportion shift no changes in the amount of overall vehicle manufacturing or deliveries would be expected.

2. Technology Improvements

To meet the requirements for criteria air pollutant and precursor (CAP) emissions of the proposed ACC Program, manufacturers would be expected to reduce CAPs using a range of technologies. Other specific technology improvements could include load reductions and accessory improvements employed to reduce GHG emissions. Improvements in aerodynamics that reduce drag coefficients include installation of skirts, air dams, underbody covers, and application of more aerodynamic side view

mirrors. In addition to the standard aerodynamic treatments, a second level of aerodynamic technologies could include active grille shutters, rear visors, and larger under body panels. Additional actions to reduce emissions may include installation of low drag brakes that reduce sliding friction of disc brake pads on rotors, and installation of front or secondary axle disconnects for four-wheel drive vehicles that reduce energy loss. Improvements to the powertrain (engines and transmissions) and vehicle improvements related to aerodynamics, low rolling resistance tires, auxiliary improvements, mass reduction, electric drive and hybrid systems are further discussed in the LEV III Staff Report, and in the following discussion.

a. Engine Improvements and Emission Control Systems

Manufacturers would be expected to continue to improve valve timing, cylinder deactivation, turbocharging, gasoline direct injection and other systems that would reduce GHG emissions. To reduce CAPs, manufacturers would be expected to improve current emission control system technologies across their light- and medium-duty vehicle fleet. Based on past compliance with previous versions of the LEV regulation (i.e., LEV I and LEV II), these improved emission control systems would be expected to include more efficient catalysts, secondary air injection, hydrocarbon adsorbers, and improved evaporative emission control systems.

Similarly, it is expected that the technologies necessary to meet the proposed LEV III evaporative emission standards would generally be the same as the technologies currently used to meet the existing optional zero evaporative standards. Because the types of technologies used currently would also be employed to meet the amended regulations, no substantial change in the manufacturing of emissions control equipment would be expected. These zero evaporative technologies consist of a hydrocarbon scrubber, air intake system element, and additional use of low/no permeation materials. The hydrocarbon scrubber and the air intake system element both generally consist of activated carbon, which acts to store fuel vapors. Steel would likely be used as no-permeation material, while various polymer materials, such as ethyl vinyl alcohol and fluorinated polymers, would be used as low-permeation materials. ARB staff expects that, for a limited number of vehicle models, a vapor blocking valve would be used to seal vapors in the fuel tank.

b. Improved Transmission Efficiency

In response to current and proposed regulations requiring reductions in GHG emissions from motor vehicles, manufacturers are incorporating improved transmissions on their vehicles. The transmission types involved include conventional automatic transmissions with up to 8 or 9 speeds; dual clutch automated manual transmissions that offer the efficiency of a manual transmission, but shift gears automatically; and continuously variable transmissions (CVTs) that can change seamlessly through an infinite number of effective gear ratios between maximum and minimum values (SAE 2011a). Transmission types installed in vehicles to comply with the proposed GHG emissions reductions would be similar to existing technology and equipment, so substantial changes in manufacturing requirements would not be expected; however, the volume

manufactured could change, but would not be anticipated to result in a substantial increase in manufacturing capacity.

c. Improved Air Conditioning Systems

The predominant refrigerant currently used in new vehicles is hydrofluorocarbon-134a (HFC-134a), which has a relatively high GWP of 1,430 (U.S. EPA 2010a). Though the current Pavley regulations (which is part of the LEV II regulation) includes a credit incentive for using refrigerants with a GWP of 150 or less, an industry-wide replacement of HFC-134a with such low GWP refrigerants, most likely 2,3,3,3-tetrafluoropropene (commonly known as HFO-1234yf), is would not anticipated to occur until model year 2017 when availability of the new refrigerant increases and its costs decrease (U.S. EPA 2010a).

It is anticipated that auto manufacturers would work with suppliers of air conditioning (AC) systems to adapt to using HFO-1234yf. Such adaptations would likely include the addition of an internal heat exchanger to maintain AC efficiency. Some modifications at vehicle assembly plants would also be needed to accommodate the mild flammability of HFO-1234yf. By the time LEVIII would go into effect, manufacturers would be familiar with these changes from complying with low-GWP requirements established by the European Commission that start with model year 2011(U.S. EPA 2010a).

In addition, the AC service industry would be expected to purchase new machinery and tools for refrigerant recovery, recycling, and recharging and train and certify technicians on proper handling of new refrigerant (Cancel, 2011). Moreover, chemical manufacturers would need to develop new procedures and construct new facilities to produce the new refrigerant (Honeywell and DuPont, 2010). Again, these types of changes are currently in process to serve the European market, so a substantial increase in manufacturing capacity would not be expected. Additionally, in response to current and proposed regulations requiring reductions in GHG emissions from motor vehicles, manufacturers are incorporating improved AC efficiency technologies in their vehicles. Because the AC hardware installed in vehicles to comply with the proposed GHG emissions reductions would be similar to existing technology and equipment, no substantial changes in manufacturing requirements would be expected.

d. Lighter Materials

Vehicle manufacturers are increasingly seeking to reduce the weight of their vehicles, without compromising vehicle safety, to both reduce emissions and increase fuel efficiency. Typically, for every 10 percent reduction in vehicle weight a 6 to7 percent reduction in GHG emissions is achieved (Cheah 2007). These weight reductions are being achieved through the use of improved vehicle design and lightweight materials, such as high-strength steel, aluminum, magnesium, plastics and carbon composites (polycarbonate). These materials are already incorporated on vehicles today and would be expected to be increasingly used in future vehicle designs. However, such an increase would not be anticipated to result in a substantial increase in manufacturing capacity, mining, or transportation. Existing plants would be retooled for manufacturing

these lighter-weight materials. It is expected that more weight reduction would be achieved in heavier vehicle models, as opposed to smaller models, which already achieve most of the weight reductions possible without compromising safety or performance. Thus, the weight reductions would not be expected to alter vehicle safety.

e. Low-Rolling Resistance Tires

One of the technologies under development to reduce vehicle emissions and increase fuel efficiency is the development of low-rolling resistance tires. Rolling resistance is primarily due to deformation of the tire sidewall, which generates heat representing lost energy. It is estimated that 5 to15 percent of light-duty fuel consumption is used to overcome rolling resistance in passenger cars (U.S. Department of Energy 2011). While considerable improvements have been made in reducing the rolling resistance of vehicle tires, tire manufacturers have indicated that further reductions in rolling resistance are possible, i.e., up to 50 percent. For most passenger vehicles, a 10 percent reduction in rolling resistance will have the practical effect of reducing emission by about 1 to 2 percent (TRB 2006). These reductions in rolling resistance would be expected through improved tire designs and materials, such as silicon oxide, a principal component of sand and glass. Low-rolling resistance tires are currently standard equipment on the Chevrolet Volt and Toyota Prius. ARB modeled all vehicles using low rolling resistance tires by 2025.

3. California Evaporative Emission Regulations

The proposed amendments include vehicles certification requirements from zero evaporative emission standards. Manufacturers would comply with these regulations through testing. The equipment needed for compliance would not be anticipated to differ substantially from that which is currently used.

4. Manufacturer Size Definition

Two proposed amendments would affect the size definitions of manufacturers. First, staff propose to decrease the intermediate volume manufacturer (IVM) (i.e., large volume manufacturer [LVM] threshold from 60,000 PCs, LDTs, and MDVs on average in California to 20,000 on average). Staff also propose that two manufacturers' sales be aggregated for determination of size if one manufacturer owns greater than 33.4 percent of another manufacturer, assuring a level playing field. All current IVMs, except Volvo, Subaru, Jaguar/Land Rover and Mitsubishi, would be expected to become LVMs in 2018, and meet the full ZEV requirements starting that year. This is definition change and would not be anticipated to result in any physical changes.

5. Amendments to the Environmental Performance Label

Manufacturer compliance with the Federal Fuel Economy and Environment Label would be deemed compliant with the California Environmental Performance Label. Thus, vehicles would have one single label that would display its Smog Score and Global Warming Score. This would save manufacturers from having to print two separate

labels as well as from having to report two separate scores for both the state and federal labels. Reducing the number of labels is preferable to manufacturers because it reduces confusion by consumers who may not easily understand the difference between the two labels, particularly customers in other states who currently are seeing a California-based label on their cars. In response to this regulation, manufacturers would only present the federal label on the vehicles they market, reducing the resources needed to make, print on, and dispose of, a second label.

6. Amendments to the On-Board Diagnostic System Requirements

The proposed amendments to the OBD II regulation would consist of clarifications and relaxations, which include delays to the required start dates of a few OBD II monitoring requirements. Manufacturers would be expected to take advantage of the delays to improve their system strategies and develop robust monitors to meet the requirements.

7. Amendments to the Specifications for California Certification Fuel Regulation

The proposed E10 Certification Fuel changes apply only to on-road vehicles, excluding on-road motorcycles. The California certification exhaust test fuel specifications for the spark-ignition, off-road categories (small off-road engines, large spark-ignition engines, recreational marine spark-ignition engines, and off-highway recreational vehicles) would not change when a new E10-based certification test fuel is adopted under the LEVIII regulatory proposal.

B. Zero Emission Vehicle Regulation (ZEV)

1. Fleet Mix

The requirements of the ZEV regulation as proposed for amendment under the ACC Program are designed to allow vehicle manufacturers to comply with these requirements in a variety of ways. While the proposed amendments to the ZEV regulation would require manufacturers to earn a minimum proportion of the required ZEV credits with actual ZEVs (i.e., battery electric vehicles [BEVs] or hydrogen fuel cell vehicles [FCV]), credits can also be earned from Transitional Zero Emission Vehicles (TZEVs) (i.e., plug-in hybrid electric vehicles).

Compliance by manufacturers with the ZEV regulation as proposed for amendment would increase the number of ZEVs and TZEVs being sold and leased in California, as compared with the current regulation. Table 4-2 summarizes this projected increase. The ZEV regulation would include flexibilities that allow manufacturers to earn ZEV credits in any number of ways. ZEVs and TZEVs would earn different amounts of credits, based on the vehicle's zero emission range, and in some case, the vehicle's power. The proposed ZEV regulation would provide different flexibilities for large- and intermediate-volume vehicle manufacturers in meeting the requirements. Large-volume manufacturers include companies that sell or lease more than 20,000 vehicles per year

in California and intermediate volume manufacturers are companies that sell more than 4,500 vehicles per year. Large volume manufacturer's account for approximately 97 percent of California's light-duty vehicle sales, must produce a minimum amount of credits from ZEVs, and are allowed to earn the rest of their requirement with credits from TZEVs. Intermediate volume manufacturers may fulfill their entire requirement with credits from TZEVs. However, any size manufacturer could, in theory, fulfill its entire requirement with ZEVs. Some manufacturers are more focused on fulfilling their ZEV requirements with BEV technologies, while others are more interested in developing FCVs. Because FCVs have a greater driving range than BEVs, FCVs earn more credit than BEVs. Also, the all-electric driving range of TZEVs varies from 10 to over 40 miles; the amount of credit each TZEV earns is linked to its all-electric range. Due to these uncertainties and historic banked credits from over compliance in the ZEV regulation from earlier years, ARB staff developed a "likely compliance scenario," summarized in Table 4-2, which takes into consideration past over-compliance with regulatory requirements, information from vehicle manufacturers, and projected market trends.

Table 4-2. Projected Numbers of Zero Emission Vehicle Types Sold or Leased in California by Type and by Year

ZEV Type	2018	2019	2020	2021	2022	2023	2024	2025
BEV	13,900	27,300	37,700	46,300	52,600	59,500	64,200	65,000
FCVs	2,900	6,200	10,600	15,400	21,600	27,800	35,200	43,600
TZEV	61,300	75,300	89,100	101,900	116,300	131,200	146,900	161,700
Total	78,100	108,800	137,400	163,600	190,500	218,500	246,300	270,700

Notes: ZEV = Zero Emission Vehicle (i.e., battery electric vehicles and fuel cell vehicles); TZEV = Transitional Zero Emission Vehicles (i.e., plug-in hybrid electric vehicles with an electric power range of 20 miles); BEV = Battery Electric Vehicle; FCV = Fuel Cell Vehicle (hydrogen).
Source: ARB's projections of a "likely compliance scenario" are based on past over-compliance with regulatory requirements, information from vehicle manufacturers, and projected market trends. More detailed are provided in the Staff Report.

2. Battery Production

The increase in BEVs and TZEVs (e.g. PHEVs) produced by manufacturers to meet requirements of the amended ZEV regulation would be accompanied by an increase in the production of propulsion batteries. Current BEV and TZEV battery technology involves use of nickel-metal or lithium-ion propulsion batteries.

Table 4-3 shows ARB's estimates of the amount of propulsion batteries that would be produced by vehicle manufacturers to meet the proposed requirements of the ZEV regulation. The projected quantities listed in Table 4-3 represent the amount of battery capacity, which is the amount of energy stored in a battery. Battery capacity is used to express the projected increase in propulsion batteries because the amount of battery capacity installed in each vehicle would vary according to its size and desired range.

Table 4-3. Projected Annual Increase in Battery Production (MW-hr)								
Year	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Capacity of Propulsion Batteries	108	541	838	1,172	1,459	1,755	2,008	2,182

Notes: MW-hr =megawatt hours = 1,000,000 watts
Source: Projections estimated by ARB 2011b

It is expected that the longevity of batteries would be sufficient to serve their function during the full operational life of the vehicle. For instance, the nickel-metal hydride battery included in the 2011 Toyota Prius (non-plug-in) is designed to last the life of the car or approximately 180,000 miles (Toyota Prius Battery 2011).

Because the number of BEVs and TZEVs produced would generally be offset by a corresponding decrease in production of internal combustion engine-based vehicles, a net increase in vehicle production facilities would not be anticipated. As the demand for propulsion batteries increases, however, new manufacturing facilities may need to be constructed and/or existing plants would be retooled to increase production. Some vehicle manufacturers would produce the batteries used in their cars while others would purchase the batteries from suppliers. Lithium-ion batteries require higher quality-control than nickel-metal batteries, often including clean-room production facilities, which may necessitate the building of new production facilities.

3. Lithium Demand

More vehicle manufacturers are considering the use of lithium-ion batteries in their BEV and TZEV models instead of nickel-metal hydride batteries (USGS 2011). Lithium is a favorable material, because it is the lightest of all metals and an excellent conductor of electricity (Gruber et al. 2011). Lithium-ion batteries are advantageous, because they have no memory effect, little discharge, and no scheduled cycling is required to prolong their useful life (Notter et al. 2010). Memory effect is an alleged effect observed in nickel cadmium rechargeable batteries that causes them to hold less charge. It describes one very specific situation in which certain NiCd batteries gradually lose their maximum energy capacity if they are repeatedly recharged after being only partially discharged. The battery appears to "remember" the smaller capacity. In addition, for production volumes greater than 300,000 units per year, lithium-ion batteries are projected to be less expensive to produce than nickel-metal hydride batteries (Snyder, Yang, and Miller 2009). A study performed at the University of Michigan's Center for Sustainable Systems concluded that the world supply of lithium is sufficient to support lithium demand, even with rapid and widespread adoption of electric vehicles (Gruber et al. 2011). USGS has identified the world supply of economically recoverable lithium to 33 million metric tons (USGS 2011) whereas the highest demand scenario evaluated by Gruber et al. (2011) would not exceed 20 million metric tons for the period 2010 to 2100.

Recycled lithium content has been historically insignificant but has increased steadily due to the growth in the consumption of lithium batteries (USGS 2011). One U.S.

company has recycled lithium metal and lithium-ion batteries since 1992 at its facility in British Columbia and in 2009, the U.S. Department of Energy awarded $9.5 million to a company to construct an advanced lithium battery recycling facility in Ohio (Toxco Inc. 2009; USGS 2011).

4. Battery Disposal, Recycling, and Exchange

At this time, PHEV and BEV propulsion batteries are replaced at authorized original equipment manufacturer (OEM) service centers if needed. However, vehicle manufacturers differ in how they are addressing the need to properly handle or dispose of propulsion batteries after they reach the end of their useful life in the PHEVs and BEVs they power. Toyota has a battery recycling program, in which dealerships will provide a $150 recycle fee to dismantlers that turn in used high-voltage Toyota batteries (Toyota Motor Corporation 2011a; Toyota Motor Corporation 2011b). Both General Motors and Nissan have made arrangements with power companies to develop new ways of using old batteries, including storage of solar or wind energy during peak generating times for later use (renewable power management), backup power management, and peak price arbitrage (St. John 2010; Recycling International 2011; Nissan Motor Co., Ltd. 2011). This approach acknowledges that a large amount of energy remains stored even in partially discharged batteries. Secondary uses for advanced batteries are also being investigated at a number of research institutions (NREL 2011; Neubauer and Pesaran 2011; Williams 2011). An electric taxi battery switchable battery project is underway in Japan and will be developed in San Francisco (Better Place 2010). However, no vehicle manufacturer has yet announced plans to produce a switchable battery electric vehicle. Moreover, vehicle manufacturers have not provided information about how batteries would be handled after their “second life.” A study at the National Renewable Energy Laboratory concludes that if second uses for batteries are determined not to be economical then recycling them would be the next economically superior option (Neubauer and Pesaran 2011).

Federal and state agencies also regulate and/or research how automotive propulsion batteries should be handled at the end of their useful life. Regulations under the federal Resource Conservation and Recovery Act (RCRA) nickel-metal hydride batteries and lithium-ion batteries are classified as non-hazardous waste and are not required to be recycled. Per RCRA hazardous waste listings & criteria (40 CFR 261.4, Exclusions), fully spent consumer lithium batteries are neither toxic nor reactive and are considered non-hazardous (NEMA 2001). Lithium is not included on the list of metals that the Occupational Safety & Health Administration considers to be toxic (OSHA 2011), nor does it exhibit any one of the hazardous characteristics according to U.S. EPA’s Toxicity Characteristics Leaching Procedure. While there is no lithium metal present in a fully spent lithium-ion battery, the larger lithium-ion battery cells used for automotive propulsion reach the end of their useful life before they are completely spent.

Nonetheless, U.S. EPA does recognize that lithium-ion batteries used for vehicle propulsion are a new and emerging technology and are being studied further. U.S. EPA formed the Lithium-ion Batteries and Nanotechnology Partnership in June 2009 to

conduct a screening-level life cycle assessment of current and emerging lithium-ion batteries and battery components (e.g., battery anodes made from single-wall carbon nanotubes) used in TZEVs, ATZEVs, and BEVs (U.S. EPA 2010b). Members of the partnership include battery manufacturers, research institutions, battery recycling companies, the U.S. Department of Energy's Argonne National Laboratory, and the Environmental Defense Fund. The Partnership is examining the potential environmental impacts of lithium-ion batteries, including the extraction and acquisition of raw materials, materials processing, product manufacturing, produce use, and final disposal or disposition. The partnership will also determine whether lithium-ion battery systems present environmentally preferable options to existing systems such as the use of lead-acid batteries in internal combustion systems.

California's hazardous waste management regulations classify all types of batteries, including nickel-metal hydride and lithium-ion batteries, as hazardous waste when discarded and must be managed accordingly. More specifically, facilities that treat, store, dispose and recycle batteries in California are also regulated under California's hazardous waste generator laws and regulations for Universal Waste (CCR, Title 22, Section 66261.9). These facilities are regulated and inspected by the California Department of Toxic Substances Control (DTSC), which is authorized by U.S. EPA to administer its own hazardous waste program for California. The local Certified Unified Program Agency (CUPA) is given authority to enforce hazardous waste management laws and regulations at the local level by the Secretary of Cal/EPA. Generators of universal wastes must recycle their waste by relinquishing it to the following: (1) a universal waste handler (e.g.; household hazardous waste facility, a 'Take-it-Back Partner' such as retailers or manufacturers); (2) a universal waste transporter; or (3) a destination facility (facility permitted by DTSC to treat, store, dispose or recycle).

5. Plug Electric Vehicle Charging Infrastructure

Based on the data summarized in Table 4-2, there would be approximately 367,000 BEVs and 883,000 TZEVs operating in California in 2025. This growth in plug electric vehicles would be accompanied by increased demand for electric charging infrastructure. Virtually all plug electric vehicles require at least one readily available charging station at their "home" location and national travel survey data indicate that vehicles spend 66 percent of their time parked at this their "home" location (EPRI 2011). Thus, it is anticipated that plug electric vehicles, both BEVs and PHEVs, would primarily be charged in residential areas during hours between late afternoon and early morning. A survey conducted by EPRI and Southern California Edison about consumer's perceptions of plug-in hybrid electric vehicles found that 95 percent of respondents would prefer to charge their electric vehicle at home (EPRI and SCE 2010). Nonetheless, some vehicle charging at workplaces and public settings may occur if electric vehicle supply equipment is available. Approximately 1,300 public charging stations are currently being upgraded to the current plug standard and federal programs are funding the installation of close to 2,000 additional public charging stations in California. (California Plug-in Vehicle Collaborative, 2010)

6. Electricity Demand

The charging of BEVs and TZEVs has the potential for both positive and negative effects to the electric grid. The timing of charging is a key determining factor. For residential charging, the general case is that the vehicle will begin charging after it arrives at home and is plugged in. National Personal Transportation Survey data indicate that the peak arrive time is 5-6 p.m.; however, only about 12 percent of vehicles arrive home during this hour, leading to a distribution of charging onset times. This results in an effective peak charging load of about 700 watts per vehicle. Thus, while residential charging power levels vary from about 1.4 to 7.7 kW, the average effect of a single vehicle on the electric system is far lower. There are significant efforts underway to alter the load shape generated by vehicle charging, whether by use of electricity pricing incentives, actively managed or smart charging, or onboard programming of charging times. These would have the effect of moving the load off the peak. At a system level, due to diversity, the electricity demand of these types of vehicles is relatively low, resulting in minimal effects to utility generation and transmission assets, particularly in the near term. According to the Electric Power Research Institute, the potential stresses on the electric grid can be avoided through asset management, system design practices, and managed charging to shift a significant amount of the load away from system peak (Electric Power Research Institute 2011).

7. Fuel Cell Production

The increase in FCVs produced by manufacturers to meet requirements of the amended ZEV regulation would be accompanied by an increase in the production of hydrogen fuel cells. As the demand for automotive fuel cells increases, new manufacturing facilities may need to be constructed and/or existing plants would be retooled to increase production. Some vehicle manufacturers would produce fuel cells in their own facilities cars while others would purchase the fuel cells from suppliers. However, because the number of FCVs produced would generally be offset by a corresponding decrease in production of internal combustion engine-based vehicles, a net increase in vehicle production facilities would not be anticipated.

8. Platinum Demand

Platinum is a vital component of proton exchange membrane fuel cells, which is the leading type of fuel cell that would be used in FCVs. The proton exchange membrane fuel cell's primary advantages include low operating temperature (approximately 80 degrees Celsius), high electric current densities, fast start capability, no corrosive fluid spillage hazard, low weight, small size, and potentially low-cost to manufacture (Spiegel 2004). Platinum serves as the catalyst that splits hydrogen into ions and electrical current (Bourzac 2008). Thus, increased production and sales of FCVs would be accompanied by an increase in demand for platinum and platinum-group metals. However, the leading demand sector for platinum-group metals is currently catalysts to decrease emissions of CAPs in both light- and heavy-duty vehicles (USGS 2011).

9. Fuel Cell Disposal, Recycling, and Exchange

Fuel cells for hybrid vehicles are manufactured once for each vehicle, and are designed to last for the lifetime of the vehicle, which is somewhere between 150,000 and 200,000 miles, or 15 to 20 years (HybridCars.com 2011). Replacement costs for spent fuel cells remains largely unknown because they are seldom replaced; however, there are some anecdotal reports of total battery replacements costing about $3,000 (HybridCars.com 2006a).

Eventually the batteries will no longer hold a significant charge and will need to be properly managed at the end of their life. Once the vehicle battery can no longer be used for its intended purpose, it becomes a waste. In California, all types of batteries are considered to be a hazardous waste and are managed under the Universal Waste Rule, unless determined they do not exhibit a characteristic of a hazardous waste. The Department of Toxic Substances Control's (DTSC) Universal Factsheet noted that, "Universal waste batteries include rechargeable nickel-cadmium batteries, silver button batteries, mercury batteries, small sealed lead acid batteries (burglar alarm and emergency light batteries), most alkaline batteries, carbon-zinc batteries, and any other batteries that exhibit a characteristic of a hazardous waste." DTSC had earlier noted on their website (since removed) that 'Per this definition, hybrid electric vehicle batteries may also be considered Universal Wastes -- check with the manufacturer of the vehicle for further information about the composition of such batteries' (DTSC 2010).

While battery toxicity may be a concern, today's hybrids use nickel–metal hydride (NiMH) batteries or Lithium-Ion batteries, which are not environmentally problematic, as are the rechargeable nickel cadmium or non-rechargeable metallic lithium batteries. Some manufacturers will recycle spent batteries reducing the need for disposal the potential for toxic hazards (HybridCars.com 2006b). Lithium-Ion cells contain no heavy metals, nor any toxic materials (TeslaMotors.com 2008). Unlike caustic lead acid car batteries, advanced Lithium-Ion batteries do not use harmful acids or metals, such as lead, to store electrical power. Lithium-Ion batteries use copper, cobalt, iron and nickel, and are considered safe for landfill disposal and incinerators (HybridCars.com 2009); however, it is currently illegal in most states to dispose of any Lithium-Ion batteries as municipal or household waste. Lithium is fairly valuable, as are the other materials involved, and there is economic incentive to reuse the components.

Manufacturers are currently working on battery recycling infrastructure, and are committed to supporting a responsible disposal and recycling infrastructure for spent batteries, and there are plans to construct America's first recycling facility for Lithium-Ion vehicle batteries via a grant from the U.S. Department of Energy. To encourage recycling, two automobile manufacturers place decals with a toll-free number on their hybrid battery packs. One offers a $200 incentive to ensure that every battery comes back to the company, and has a comprehensive battery recycling program in place and has been recycling nickel-metal hydride batteries since 1998. The other manufacturer collects the batteries and transfers them to a preferred recycler to follow their prescribed process: disassembling and sorting the materials; shredding the plastic material;

recovering and processing the metal; and neutralizing the alkaline material before sending it any waste material to a landfill (HybridCars.com 2006b).

Batteries that power hybrid vehicles will be recycled at recycling facilities, where they will be transformed into valuable scrap commodities like cobalt, copper, nickel and lithium carbonate, which can then be used to more efficiently produce another battery. At the battery recycling plants, the recycling process begins with manually sorting the batteries according to their chemistries (may also be done prior to arrival). NiCd, NiMH, Lithium-Ion and lead acid are often placed in designated boxes at the collection point. Then combustible materials, such as plastics and insulation, are removed using a gas-fired thermal oxidizer. Gases from the thermal oxidizer are sent to the plant's scrubber where they are neutralized to remove pollutants. The process leaves the clean, naked cells, which contain valuable metal content. The cells are then chopped into small pieces, which are heated until the metal liquefies. Non-metallic substances are burned off; leaving a black slag on top that is removed with a slag arm. The different alloys settle according to their weights and are skimmed off (Buchmann 2001).

There is one battery recycling facility in Lancaster, California that collects spent batteries and recycles them. A non-profit corporation was founded to promote the collection and recycling of rechargeable batteries in North America, and there are several facilities in the United States that recycle spent batteries. Europe and Asia are also active in recycling spent batteries and have developed technology to retrieve cobalt and other precious metals from spent Lithium Ion batteries. Lithium can be re-used repeatedly, reducing the concern of potential shortages in the future.

The Society of Automotive Engineers formed a Committee for Fuel Cell Standards that has published "Recommended Practice to Design for Recycling Proton Exchange Membrane (PEM) Fuel Cell Systems". This publication provides guidance about which advises manufacturers to consider environmental impacts and recommended practices when producing recyclable fuel cells for automotive use. More specifically, the report explains ways fuel cell design can account for the need to disassemble and recycle the product at the end of its useful life.

Carbon nanotubes could replace expensive platinum catalysts and help finally make fuel cells economical. The California Department of Toxics Substances Control is currently reviewing waste issues associated with nanotechnologies, including carbon nanotubes which are used in fuel cells (Kang 2010).

Used fuel cells are classified as ignitable hazardous waste under the federal Resource Conservation and Recovery Act.

The Society of Automotive Engineers formed a Committee for Fuel Cell Standards that has published "Recommended Practice to Design for Recycling Proton Exchange Membrane (PEM) Fuel Cell Systems". This publication advises manufacturers to consider environmental impacts and recommended practices when producing recyclable fuel cells for automotive use. More specifically, the report explains ways fuel

cell design can account for the need to disassemble and recycle the product at the end of its useful life (SAE 2011b).

10. Hydrogen Fueling Infrastructure

The number of FCVs entering the vehicle fleet is particularly important, because it serves as the trigger that activates the CFO regulation, which is described below in Chapter II, Section C. Detail about the entry of FCVs into the statewide fleet, associated demand for hydrogen fueling stations, and the construction and operation of hydrogen fueling stations is included in the discussion of Clean Fuels Outlets in Section C below.

C. Clean Fuels Outlets

1. Triggering of the Clean Fuels Outlet Requirements

Under the Clean Fuels Outlet (CFO) regulation, requirements for new hydrogen fuel outlets would be activated when Department of Motor Vehicles records and automaker forecasts indicate that, in three years, the total number of FCVs in an air basin would meet or exceed the regional trigger level of 10,000 FCVs. It is more likely that the CFO regulation would initially be triggered by the air basin-wide trigger level of 10,000 FCVs rather than the statewide trigger level of 20,000 FCVs because of the spatial distribution of residential and vehicle population across the State.

Because the ZEV regulation would be flexible in that manufacturers could fulfill their requirements by marketing hydrogen FCVs, as well as other types of vehicles, it cannot be determined ahead of time exactly when the CFO regulation would be activated by the regional or statewide trigger levels. Nonetheless, ARB staff developed a range of compliance scenarios based on confidential surveys of vehicle manufacturers. At one of the fastest rates, the statewide vehicle fleet could consist of up to 53,000 FCVs fleet during the 2015-2017 timeframe. At the slowest entry rate the statewide fleet would not include 20,000 FCVs until 2020 with the10,000 unit trigger level possibly being reached in an air basin in 2018. These two scenarios named fast entry (Upper Bound) and slow entry (Lower Bound) respectively, are discussed in greater detail below.

a. Fast-Entry of Fuel Cell Vehicles into the Vehicle Fleet

In early 2011, ARB, the California Energy Commission, and the California Fuel Cell Partnership conducted a confidential survey of vehicle manufacturers on FCV production and rollout plans, including vehicle numbers and deployment regions (CEC 2011, p. 56). Automakers were asked to assume that hydrogen fueling infrastructure would be in-place ahead of FCV rollouts. This assumption allowed each manufacturer to base its estimates on the status of its FCV technology development and its ability to achieve production numbers necessary to reach an economy of scale suitable for commercialization, including production facilities and supply chains. The results of this survey, which reflect a fast-entry of FCVs into the fleet, are summarized in Table 4-4.

Table 4-4. Projected Number of Fuel Cell Vehicles Entering the Vehicle Fleet by Year for the Upper Bound Scenario

Region	2011	2012	2013	2014	2015-2017
California Statewide	253	312	430	1,389	53,000
South Coast Air Basin	197	240	347	1,161	34,230

Notes: Projections of FCVs are based on a confidential survey of vehicle manufacturers conducted by the California Energy Commission and The California Fuel Cell Partnership and, thus, do not consider over-compliance with the proposed ZEV regulation by vehicle manufacturers.
The South Coast Air Basin consists of all of Orange County and the urban portions of Los Angeles, Riverside and San Bernardino counties and is under the jurisdiction of the South Coast Air Quality Management District.
Source: CEC 2011, p.56.

While the air basins where new FCVs would be sold or leased are not specified by the ZEV regulation, it is anticipated that most of the early FCVs would be sold or leased for operation in the South Coast Air Basin where several hydrogen stations are or will soon be operational. According to the FCV projections for the Upper Bound scenario, the regional trigger of 10,000 FCVs could be activated within the South Coast Air Basin as early as 2015, as shown in Table 4-5, with the statewide trigger of 20,000 FCVs activated shortly thereafter.

b. Slow-Entry of Fuel Cell Vehicles into the Vehicle Fleet (Lower Bound Scenario)

To develop a compliance scenario in which FCVs would enter the vehicle fleet at a slow pace, ARB assumed manufacturers would sell or lease a mix of BEVs, FCVs, and PHEVs to meet the proposed ZEV regulation requirement to have the statewide fleet be 16 percent ZEVs by 2025. This scenario may also be referred to as a Lower Bound compliance scenario. Table 4-5 shows the number and mix of BEVs and FCVs that could enter the statewide vehicle fleet under a minimum compliance scenario. This set of projections is based on the ZEV "likely compliance scenario" summarized on Table 4-2. Table 4-5 also shows how the cumulative number of FCV would grow over ime.

Table 4-5. Projected Number of Fuel Cell Vehicles Entering the Vehicle Fleet by Vehicle Type and Year for a Lower Bound Scenario

ZEV Type	2017	2018	2019	2020	2021	2022	2023	2024	2025
BEVs	—	14,000	27,000	38,000	46,000	53,000	60,000	64,000	65,000
FCVs	—	3,000	6,000	11,000	15,000	22,000	28,000	35,000	44,000
Combined	—	17,000	33,500	49,000	61,000	75,000	88,000	99,000	109,000
Cumulative FCVs	10,500	13,500	19,500	30,500	45,500	67,500	95,500	130,500	174,000

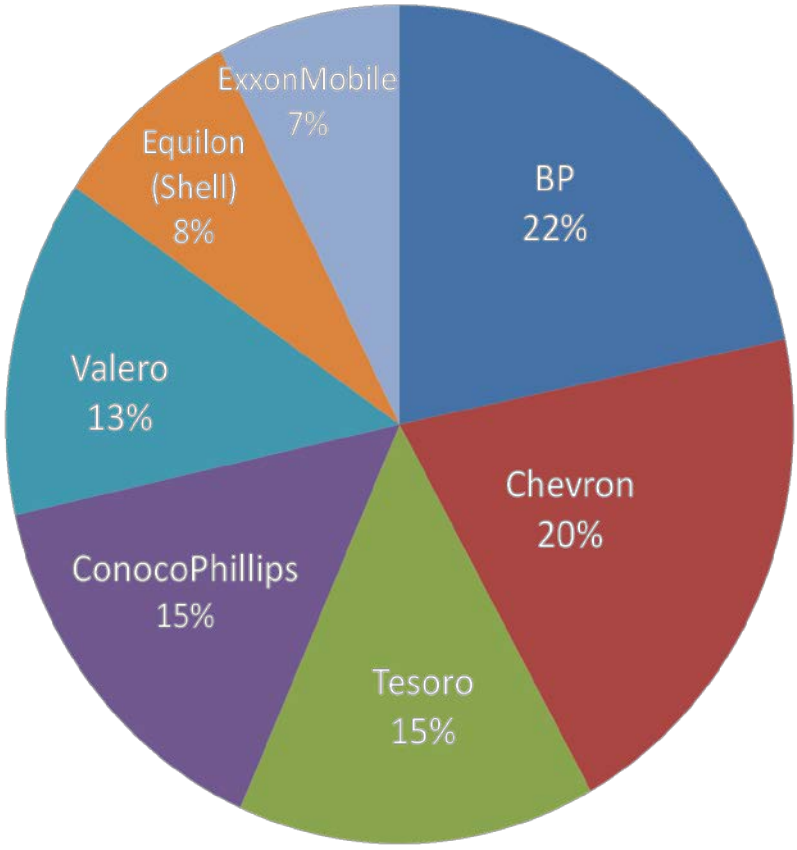
Notes: Cumulative totals do not reflect fleet turnover, which is the rate at which consumers purchase new vehicles to replace old ones.
ZEV = Zero Emission Vehicle; BEV = Battery Electric Vehicle; FCV = Fuel Cell Vehicle.
Source: ARB's projections of a "likely compliance scenario" are based on past over-compliance with regulatory requirements, information from vehicle manufacturers, and projected market trends. More detailed are provided in the Staff Report,

According to the projections for the Lower Bound scenario, the regional CFO trigger of 10,000 ZEVs would be activated in 2018 assuming 75 percent of the total FCVs are placed in one air basin (which will most likely be the South Coast air basin), and the statewide trigger of 20,000 ZEVs would be activated in 2020.

2. New Hydrogen Fueling Stations

The CFO regulation would be activated once the air basin-wide trigger level of 10,000 FCVs is expected to be met. ARB would then calculate the volume of hydrogen fuel the FCV fleet would demand, subtract the fuel availability at the time, and determine the additional number of hydrogen fuel stations needed to meet the projected demand. The requirement to build new stations would then be allocated to the major refiners and importers of gasoline based on their annual share of the gasoline market. Figure 4-1 illustrates each refiner/importer's share of the total gasoline produced or imported into California in 2010 and Table 4-6 summarizes how the required new stations could be divided among each refiner/importer once the trigger level of 10,000 FCVs is reached in an air basin.

Figure 4-1. Market Share of Major Refiners and Importers of Gasoline (2010)



Source: BOE 2010

Table 4-6. Projected Allocation of New Hydrogen Fuel Stations			
Projected Hydrogen Vehicle Fleet in a Single Air Basin (FCVs)			10,200
Hydrogen Fuel Market			
Demand, annual (kg/yr)			3,000,000
Pre-Existing Supply, annual (kg/yr)			1,700,000
Deficit, annual (kg/yr)			1,300,000
Deficit, average daily (kg/day)			3,560
Activated CFO Requirements and Market Share			
	2010 Market Share (%)	**Hydrogen Fuel (kg/day)**	**Stations**
Total	100%	3,560	9
BP	22%	783	2
Chevron	20%	712	2
Tesoro	15%	534	1
ConnocoPhillips	15%	534	1
Valero	13%	463	1
Equilon (Shell)	8%	284	1
ExxonMobil	7%	249	1

Notes: The information presented in this table represents a hypothetical scenario only. Values in the table reflect how the requirements to build new hydrogen fuel stations would be allocated based on total demand (using EMFAC VMT data and a fleet-average fuel economy of 67 mi/kg), pre-existing supply, and the market share of various refiners and importers of gasoline under the fast-entry scenario of FCVs entering the vehicle fleet in the South Coast Air Basin. The total number of new hydrogen fuel stations required would also vary according the proportion of new FCVs that are part of an organization's fleet and have their own privately operated fueling station.
FCV = Fuel Cell Vehicle; kg/yr = kilograms per year; kg/day = kilograms per day
Source: Sample calculations provided by ARB.

As shown in the example in Table 4-6, a minimum of nine new hydrogen stations would be required in the South Coast Air Basin when the trigger level of 10,000 FCVs is reached in the air basin. Based on the Upper Bound scenario presented in Table 4-6, this trigger level and associated allotment of new hydrogen fuel stations could occur as early as 2015.

Starting in 2016 in the Upper Bound Scenario, the number of vehicles statewide would exceed the 20,000 statewide trigger requiring the construction of 39 additional stations.

Under the Lower Bound compliance scenario the regional trigger would be reached in the South Coast Air Basin requiring five new hydrogen stations in 2018 and nine additional stations in 2019. By 2020, 26 new stations would be required statewide.

Once notified of their obligation, responsible parties would have approximately 2-1/2 years to meet fulfill their respective allocation requirements.

3. Locations of Hydrogen Fuel Outlets

When ARB assigns the allocations for new hydrogen fuel outlets, ARB would also inform refiners/importers of the general geographic areas where stations would be most useful to and valued by FCV drivers, but each refiner/importer would be responsible for selecting specific station locations.

While vehicle deployment projections are greatest in the South Coast Air Basin, significant vehicle deployments are also planned for the San Francisco Bay Area (California Fuel Cell Partnership 2009). However, once FCVs reach commercial viability and technology acceptance becomes widespread, the market would dictate where new FCVs are placed. As explained in Chapter II, Section C, it would be dependent upon manufacturers to identify new geographic market sectors and convey this information to ARB in their annual FCV projections.

It is anticipated that new individual hydrogen fueling facilities would be constructed at existing public retail gasoline service stations that are already managed by the retail branches of the respective refiners/importers of gasoline. These locations would also likely be in urban areas where they are positioned to serve the most drivers. Thus, it is unlikely that new hydrogen fuel outlets would be located at greenfield sites (land not previously developed), and that they would be built in locations consistent with local zoning.

4. Construction of Hydrogen Fueling Facilities

Building a new hydrogen fueling facility would typically take place at an existing retail gas station. The facilities and equipment required for hydrogen fueling could fit within the available square footage of larger gas station sites (i.e., within the same footprint of a carwash). Development of a new facility would include obtaining the standard design and building approvals and permits from the City, County and State authorities having jurisdiction. For the equipment area, construction would typically include minor trenching and filling for utilities and pouring concrete foundations for walls and equipment pads. Major equipment present at the station would include hydrogen storage tanks that hold either liquid or compressed gas, a hydrogen compression system, a refrigeration/cooling unit, safety monitors and sensors, and a system control panel. The hydrogen dispenser would typically be added to the end of an existing fueling island. However, in some cases, a gasoline dispenser may be removed and replaced with a hydrogen dispenser, or a separate stand-alone hydrogen dispensing island with or without a canopy may be added to the station. Although there is no standard station size, small volume hydrogen stations (100-250 kg/day dispensing capacity) today typically require approximately 700-800 square feet of surface area for equipment.

5. Hydrogen Station Operations

Like at a gasoline station, a FCV pulls up to a hydrogen dispenser that is designed and built to appear like a gasoline dispenser. The dispenser nozzle looks similar to a nozzle on a natural gas or propane dispenser. The nozzle locks on to the receptacle on the vehicle and, when the seal is tight, gaseous hydrogen fuel flows into the tank. Depending on the vehicle and tank size, a full fill, from empty can take from 3 to 5 minutes (California Fuel Cell Partnership 2011). Hydrogen fuel dispensers, depending on station design, can typically fuel four to eight vehicles per hour. Implementation of CFO would require that compliant stations satisfy the fueling protocol for light duty hydrogen powered vehicles specified in SAE TIR J2601 (SAE 2010).

Like gasoline stations, most hydrogen stations have their onsite fuel supply delivered by a tanker truck. Gaseous hydrogen is stored in banks of long narrow tanks secured to a truck trailer bed (referred to as a tube trailer), and liquid hydrogen is stored in large above-ground tanks. The liquid hydrogen vaporizes at ambient temperature to a gaseous state and is compressed before dispensing into the FCV. Hydrogen stored in gaseous state usually undergoes additional compression before dispensing. Hydrogen delivery frequency depends on the amount stored at each station, state of the hydrogen stored (gaseous or liquid) and demand for hydrogen at the station In the early years when there are relatively few FCVs, deliveries of hydrogen in a gaseous state would occur no more than once a week, and liquid deliveries would occur approximately once per month. Deliveries of gaseous hydrogen involve replacing an empty tube trailer with a full one, a process that takes less than one hour. Delivery of liquid hydrogen involves the transfer of liquid hydrogen from the tanker truck to the station's storage tank, a process that would typically require approximately 2 hours.

Some stations produce hydrogen onsite through electrolysis or steam methane reformation (SMR). An electrolyzer uses electrical power to separate water molecules into hydrogen and oxygen. A SMR generates steam, and uses it to separate the hydrogen from the natural gas molecule. The hydrogen is then purified, stored and then compressed for dispensing. Maintenance of the station consists of regular safety checking of hoses, nozzles and related equipment, calibration of sensors and dispensers, compressor repairs, valve/solenoid checks and normal lubrication.

6. Hydrogen Supply

Using the fast-rate scenario for FCVs entering the vehicle fleet, the total hydrogen demand when the 10,000 FCV trigger is activated in the South Coast Air Basin could represent 1.1 percent of the hydrogen supply in that area. Under the same fast-entry scenario, total statewide demand in 2020 would represent 3.9 percent of the merchant hydrogen supply, and in 2024 (when the regulation sunsets), it could represent 9.2 percent.

Using the more conservative slow-rate scenario for FCVs entering the vehicle fleet, the total statewide hydrogen demand in 2020 could represent 1 percent of the merchant hydrogen supply, and in 2028, it would represent 9 percent.

7. Hydrogen Production Plants

Recently, California has favored hydrogen fueling stations using delivered hydrogen with central production over stations that produce hydrogen on site (CEC 2011). As demand increases, however, on-site reformation may begin to compete on a cost basis with delivered hydrogen. For delivered gaseous hydrogen, modifications of the central plants may be necessary to further purify the hydrogen so that it meets the purity standards required for fuel cell vehicles. Hydrogen as a transportation fuel requires higher purity levels than hydrogen for industrial uses because fuel cells stack membranes are sensitive to impurities (CEC 2011). Plant modifications are also necessary so that purified hydrogen can be compressed and dispensed into delivery trailers. The construction work associated with these plant modifications would have to satisfy State and local requirements for permitting, hazardous materials, and other resource areas, which are typically handled by local agencies. Additional land may be required to install the equipment, which may or may not fit within the hydrogen plant's existing fence line. Any earthwork activities that could generate dust would have to be conducted in accordance with local ordinances regarding dust and earthwork. Emissions associated with the operation of the hydrogen purification and compression equipment would be subject to the authority of the local air pollution control district. Any release of combustible gases could be vented through the facility's existing flare system. Hazardous wastes, such as lubrication oil waste and catalyst waste associated with the purification equipment, would be generated in small quantities. Existing hydrogen production facilities would manage additional hazardous wastes associated with the new operations according to their existing hazardous waste permits.

It is important to note that, once the statewide demand for hydrogen reaches 3.5 million kilograms per year, the California standards for hydrogen production will be in place, which require that 33 percent of the hydrogen that is produced for transportation be made from eligible renewable resources (California Public Utilities Code Section 399.12). This requirement will eventually present a business case for the construction of new hydrogen plants that produce hydrogen from renewable resources such as biogas or biomass. Recently, the world's first combined heat, hydrogen, and electric power system using biogas from the Orange County Sanitation District's wastewater treatment plant started in Fountain Valley, CA. This tri-generation system provides transportation-grade hydrogen to the public (approximately 25-50 fuel cell electric vehicle fill-ups per day), 250 kW of electric power to the wastewater treatment plant, and heat that is also used by the plant (HTAC 2011). ARB anticipates that as costs come down, more tri-generation plants could be constructed at wastewater treatment plants to meet increased demand for transportation-grade hydrogen made from eligible renewable resources. These tri-generation plants may require additional footprint beyond the plant's existing property line.

D. Consumer Response Effects

1. Fleet Turnover and Emissions

ARB's proposed ACC Program would increase new vehicle prices, starting with model year 2015. Regardless of an increase in price, it is likely that many of the technologies employed by manufacturers that lower GHG emissions and implemented to comply with the regulation (including the production of ZEVs) would result in vehicles with lower operating costs than comparable pre-regulation vehicles. Changes in vehicle prices and other attributes may affect consumer purchase decisions. For example, not all consumers would be willing to pay more for the vehicle that they might have otherwise purchased, and some consumers may purchase a used vehicle instead of a new vehicle that would be in accordance with their respective budgets. Others may wait until the following year, or respond in some other way. Still other consumers may be willing to pay the additional upfront cost for greater future reductions in operating cost, in which case the vehicle would be more attractive. Such decision changes, referred to as consumer response, can affect the California vehicle fleet mix and possibly emissions. Due to the concurrent tightening of criteria pollutant standards, even if there is a consumer response to potential price increases and changes in operating costs, the ACC program would continue to have a positive effect on tailpipe criteria pollutant emissions.

Consumer responses that result in increased traffic and vehicle miles travelled (VMT) have been factored into the emissions analysis, and are discussed in Chapter V of the LEV III Staff Report.

2. Impacts on Vehicle Sales, Fleet Size and Average Age

The impacts of the proposed regulation were assessed by forecasting a baseline future fleet mix that assumes that, absent the proposed amendments, vehicle prices and operating costs change only in response to the existing National Program requirements for model year 2012-2016. This baseline then is compared to a regulatory scenario that takes into account the estimated price and operating cost changes resulting from the proposed Advanced Clean Cars Program.

The LEV III Staff Report data reflect the differences in sales, fleet mix, and average age of the fleet between the baseline and regulation scenarios. Initially, there would be a negligible decrease in sales due to compliance with the criteria pollutant standards, while there is no concurrent reduction in operating costs resulting from these proposed amendments. However, once the GHG standards begin to phase in during model year 2017, the reduced operating costs of new vehicles makes them more attractive to consumers and total sales would be expected to increase. Sales continue to grow over the baseline until the standards have been fully phased-in model year 2025. After this point, new vehicles no longer offer any significant advantage in operating costs over used vehicles that become increasingly available on the market. Thus, the change in sales begins to decline, though these levels still represent a relative increase over

baseline totals. As a result of these increased sales, the fleet continues to grow slowly with time, making the regulation scenario fleet generally larger in all years compared to the baseline fleet. These sales increases also contribute to decreasing the average age of the fleet, implying that households are not holding onto their older vehicles longer.

3. Vehicle Miles Travelled and Rebound

The rebound effect refers to an economic theory suggesting consumers would drive more if the vehicles they use are cheaper to operate. This is potentially relevant because many of the emissions control technologies that reduce GHG emissions also serve to lower vehicle operating costs. The proposed changes of the ACC program would also result in light-duty vehicles having lower operating costs on a cost-per-mile basis. Staff at ARB examined the extent to which VMT levels in California may increase due to the incremental reduction in operating costs associated with implementation of the proposed regulatory changes under the proposed ACC Program.

The incremental increase in VMT due to rebound effects of the proposed ACC Program was estimated by ARB staff using an econometric model developed by Hymel, Small, and Van Dender (2010). The model estimates the elasticity of VMT with respect to operating costs while considering other factors such as income and congestion. ARB staff then calculated projections (e.g., likely outcomes) of future rebound effect. Based on these projected response levels, the actual expected changes in VMT were calculated using the projected operating cost reductions that would result from the proposed ACC Program. (See the LEV III Staff Report for additional details on projection methodology.) Likewise, increases in VMT due to rebound would occur in the baseline as a result of both State and national vehicle emission standards that are already in place for model years 2012-2016. These changes in VMT are reflected and accounted for in the emission inventories and estimated emission reductions in Section V of the LEV III Staff Report. Staff assumed that the same VMT changes would apply to all vehicle technology types.

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5.0 IMPACT ANALYSIS AND MITIGATION

As discussed in Chapter 4, Regulated Community Compliance Responses, implementation of the proposed ACC Program could result in the construction and operation of new manufacturing plants that specialize in the production of propulsion batteries and fuel cells. New hydrogen fueling stations could also be constructed and operated along with modifications to existing hydrogen production plants. These would likely occur within existing footprints or in areas with consistent zoning. Thus, the impact discussion below focuses on these particular responses by the regulated community. All other regulated community compliance responses would not be anticipated to result in any physical changes and; thus, would result in no impacts.

A. Aesthetics

1. Scenic Vistas, Scenic Resources, Visual Character, Light and Glare

As discussed in Chapter 4, Regulated Community Compliance Responses, implementation of the proposed ACC Program could result in the construction and operation of new manufacturing plants that specialize in the production of propulsion batteries and fuel cells. New hydrogen fueling stations could also be constructed and operated along with modifications to existing hydrogen production plants. These would likely occur within existing footprints or in areas with consistent zoning.

However, there is uncertainty as to the exact locations of these new plants, stations, and modifications, especially in regards to new manufacturing plants for producing propulsion batteries and fuel cells and in relation to the location of viewers. Construction and operation of these, though likely to occur in areas with consistent zoning, could introduce or increase the presence of artificial elements (e.g., heavy-duty equipment, removal of existing vegetation, buildings) 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 size of facilities, viewing distance, angle of view, visual absorption capacities, and the structure placement in the landscape. In addition, operation may introduce substantial sources of nighttime lighting for safety and security purposes. As a result, this impact would 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 the ARB.

Mitigation Measure A.1.

The Regulatory Setting in Chapter 3 includes, but is not limited to, applicable laws and regulations that provide protection of aesthetic resources. ARB 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 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 ACC regulations 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 would 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 would be sited to take advantage of natural screening opportunities provided by existing topography and vegetation.

- All construction, operation, and maintenance areas would be kept clean and tidy, including the revegetating and regarding disturbed soil, and storage would 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 would be avoided to the greatest extent.

- The project proponent would contact the lead agency to discuss the documentation required in the lighting mitigation plan, submit to the lead agency for review and approval a plan that describes the measures to be used and that demonstrates that the requirements of this condition will be satisfied, and notify the lead agency that the lighting has been completed and is ready for inspection.

Because the authority to determine project-level impacts and require project-level mitigation lies with the land use 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, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant impact regarding aesthetics resulting from the construction and operation of new plants, stations, and modifications may be significant and unavoidable.

B. Agriculture and Forestry Resources

1. Farmland, Zoning for Agricultural Use or Williamson Act Contract, Forest Land and Timberland

As discussed in Chapter 4, Regulated Community Compliance Responses, implementation of the proposed ACC Program could result in the construction and operation of new manufacturing plants that specialize in the production of propulsion batteries and fuel cells. New hydrogen fueling stations would also be constructed and operated along with modifications to existing hydrogen production plants.

There is uncertainty as to the exact locations of these new plants, stations, and modifications, especially in regards to new manufacturing plants for producing propulsion batteries and fuel cells; however, these would likely occur within existing facility footprints or in areas with consistent zoning. Thus, implementation of the proposed ACC Program would not be anticipated to result in the conversion of farmland, conflict with existing zoning for agricultural use or a Williamson Act contract, conflict with existing zoning for (or cause rezoning of) forest land or timberland, the loss of forest land (or conversion of forest land to non-forest use), or involve other changes resulting in conversion of farmland or forest land to non-agricultural use or non-forest use, respectively. As a result, this impact would be less than significant.

Mitigation

No mitigation is required.

C. Air Quality

1. Air Quality Plan, Air Quality Standards and Violations, Cumulative Criteria Pollutants, and Sensitive Receptors

a. Construction Impacts

As discussed in Chapter 4, Regulated Community Compliance Responses, implementation of the proposed ACC Program could result in the construction of new manufacturing plants that specialize in the production of propulsion batteries and fuel cells. New hydrogen fueling stations could also be constructed along with modifications to existing hydrogen production plants. Construction-related activities, if they occur, would be anticipated to result in an increase in CAPs and TACs (e.g., use of heavy-duty construction equipment). 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.

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 ARB. Nonetheless, the analysis provided herein provides a reasonable accounting of the types of environmental impacts that would occur with implementation of the proposed ACC Program 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, CAPs 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 PM dust emissions, which is the primary pollutant of concern during construction. Fugitive PM dust emissions (including PM_{10} and $PM_{2.5}$) 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. Exhaust emissions from off-road construction equipment, material delivery trips, and construction worker-commute trips could also contribute to short-term increases in PM emissions, but to a lesser extent. Exhaust emissions from construction-related mobile sources also include ROG and 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. Site preparation equipment and activities typically include backhoes, bulldozers, loaders, and excavation equipment (e.g., graders and scrapers). 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, construction activities could result in hundreds of pounds of daily NO_x and PM, which may exceed general mass emissions limits depending on the exact location of generation. Thus, implementation of the proposed ACC Program 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, this short-term impact would be potentially significant.

This impact would 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 the ARB.

b. Operational Impacts

Appendix T of the LEV III Staff Report provides a baseline for analysis for CAPs and GHGs, and the emissions impacts of the proposed rulemaking. This chapter began with a statistic that there are currently roughly 25 million cars operating in California, and that by 2035 more than 30 million cars will be operating in California. Prior to the establishment of ARB in 1968 photochemical smog pollution was a major health concern that caused major acute health impacts to Californians. Much of this smog was formed by automobile emissions. Over the next 40 years the ARB adopted the most stringent automobile emissions standards in the Country, including requiring use of the catalytic converter that revolutionized emissions control and dramatically reduced emissions from automobiles. Those regulations, in conjunction with regional programs to reduce emissions from refineries, power plants, and other stationary sources, led to a major improvement in air quality. In 1980, the South Coast Air Basin experienced widespread ozone levels which exceeded air quality standard for 179 days per year. In 2010 that number was reduced to 63 days per year, and those violations occurred in a much smaller portion of the Air Basin. During this same period, peak ozone concentrations in Southern California dropped more than 60percent - from 273 parts per billion (ppb) to 112 ppb. Similar air quality improvements were seen in many other regions of California.

Despite these major improvements air quality both the greater Los Angeles region and the San Joaquin Valley are classified by the U.S. EPA as “extreme” ozone non-attainment areas. This is the highest federal non-attainment classification, and these two areas of California are the only two areas of the nation granted this designation. Bringing these regions into attainment requires more significant emission controls than anywhere else in the United States.

In 2007, California adopted State Implementation Plans (SIPs) to chart the course to attainment of the 1997 federal 8-hour ozone standard. To achieve the 1997 ozone standard by the attainment date in 2023, NO_x emissions in the greater Los Angeles region must be reduced by two thirds, even after considering all of the regulations in place today, with the most significant share of needed emission reductions will come from long-term advanced clean air technologies. In the San Joaquin Valley, the SIP identified the need to reduce NOx emissions by 80 tons/day in 2023 through the use of long-term and advanced technology strategies. To put this in context, this is equivalent to eliminating the NOx emissions from all on-road vehicles operating in these regions.

Despite the dramatic emission reductions and air quality improvements achieved to date, most urban areas of California, including Southern California, the Bay Area, and the Central Valley continue to exceed the federal ozone standard . The ARB, the South Coast Air Quality Management District, and the San Joaquin Valley Air Pollution Control District are beginning to evaluate the emission reductions needed to attain the more health-protective ozone standard U.S. EPA established in 2008. In order to meet these

challenges, air quality and land-use agencies in the South Coast and San Joaquin Valley must actively pursue a coordinated strategy that results in the widespread use of zero emission technologies on transportation networks designed to reduce smog forming emissions from single occupant vehicle use.

The proposed ACC Program would reduce emissions from conventional gasoline vehicles to incredibly low levels. Over a typical vehicle's 15 year lifetime ACC compliant cars would emit less than a pound of particulate matter, and less than 10 pounds of smog forming pollutants. The proposed regulation would also continue ARB's commitment to zero emission technologies, requiring roughly 6percent of vehicles sold in California to be true zero emission vehicles. Through that mandate, ZEV technologies will continue to improve and expand into wider applications, making them a viable option for many consumers in California. The proposed ACC regulation achieves maximum feasible emission reductions from automobiles and places the State on a continuing path to ultimately meet national ambient air quality standards.

In 2006 the legislature adopted Assembly Bill 32 which outlined California's major initiatives to reduce GHG emissions, and set an emissions reduction target of meeting 1990 emissions levels by 2020, which is a reduction of roughly 30percent. In 2005 then Governor Schwarzenegger established an emissions reduction target of achieving an 80 percent reduction in 1990 GHG emissions levels by 2050. In December 2008 the Board adopted ARB's Scoping Plan which outlined the initiatives that will be implemented to reach the 2020 GHG emissions target. The proposed ACC regulation is a major component of the Scoping Plan.

In addition to meeting ozone air quality standards, achieving an 80 percent reduction in GHG emissions by 2050 will also require widespread electrification of transportation networks in California. The proposed ACC regulation and associated ZEV mandate continues ARB's path towards meeting long-term GHG emissions goals.

Overall, implementation of the proposed ACC Program would result in an emissions benefit as compared to current regulations. Table 5-1, Table 5-2, and 5-3 provide the emission benefits for calendar years 2023, 2025, 2035, and 2040 for ROG, NO_x, and particulate matter ($PM_{2.5}$) respectively. Emission benefits are fully realized in the 2035-2040 timeframe when nearly all vehicles operating in the fleet are expected to be compliant with the proposed ACC Program. By 2035 ROG statewide emissions would be reduced by an additional 34 percent, NO_x emissions by an additional 37 percent, and $PM_{2.5}$ emissions by 10 percent.

Table 5-1. Statewide and Regional Emission Benefits of the Advanced Clean Car Program: Reactive Organic Gas (ROG)				
Statewide ROG (tons/day)				
Calendar Year	**Adjusted Baseline with Rebound**	**Proposed Regulation with Rebound**	**Benefits**	**Percent Reduction**
2023	189.6	182.9	6.6	3%
2025	175.5	164.4	11.1	6%
2035	141.1	93.6	47.4	34%

Table 5-2. Statewide Emissions Benefits of the Advanced Clean Car Program: Oxides of Nitrogen (NO_x)				
Statewide NOX (tons/day)				
Calendar Year	**Adjusted Baseline with Rebound**	**Proposed Regulation with Rebound**	**Benefits**	**Percent Reduction**
2023	201.3	185.6	15.7	8%
2025	183.6	161.2	22.4	12%
2035	136.8	86.4	50.4	37%

Table 5-3. Statewide and Regional Emissions Benefits of the Advanced Clean Car Program: Particulate Matter ($PM_{2.5}$)				
Statewide PM2.5 (tons/day)				
Calendar Year	**Adjusted Baseline with Rebound**	**Proposed Regulation with Rebound**	**Benefits**	**Percent Reduction**
2023	26.7	26.0	0.6	2%
2025	27.2	26.3	0.9	3%
2035	29.7	26.8	2.9	10%

In all calendar years between 2015 and 2030, all CAP emissions remain lower for the proposed ACC program than the baseline even when accounting for any possible increases due to changes in consumer purchasing patterns. The results without consumer response are analogous to the emissions benefits described in Section V-D of the LEV III Staff Report.[1] These curves (dashed lines, open markers) reflect the

[1] The CARBITS population reflects only twenty vintages of light-duty vehicles in any calendar year which represents a subset of the EMFAC population used for the emission reductions presented in Section V-D. The emissions estimates from the two models are therefore not necessarily expected to match exactly,

changes only from improvements in tailpipe emission rates and assume there are no changes in fleet composition, though do account for any emissions increases due to the rebound effect.

Changes in the fleet size and average age would also affect CAPs. ARB staff used the fleet composition generated by CARBITS in a modified emissions inventory tool to estimate the changes in CAP emissions shown in Figure 5-1. An additional change due to a different fleet mix yields the results with consumer response (solid line, closed markers). In this case, the distribution of vehicles not only includes a greater proportion of newer vehicles, but also more vehicles in total. Total emissions are a function of both the vehicle emission rates and the number of miles that vehicles are driven. While newer vehicles will have lower emission rates, separate from the expected increase in VMT due to the rebound effect resulting from the lower operating costs, vehicles also tend to be driven more intensively in their younger years. Thus, having a greater proportion of newer vehicles and a larger total fleet size would generate additional VMT as an artifact of the modeling methodology. As a result, consumer responses to new vehicle offerings could reduce some of the expected emission reductions of $PM_{2.5}$ (circles) as a result of an increase in VMT. However these same forces could further enhance emission reductions of ROG (triangles) and have essentially no effect on NO_x (squares). For all pollutants the proposed ACC Program would continue to produce net benefits when allowing for changes in fleet composition.

In the event that total fleetwide VMT is solely a function of the rebound effect, renormalizing VMT to account only for those effects but maintaining the changes in fleet composition would result in similar changes to the percent reductions without consumer response. Appendix S contains a detailed discussion on the relationship between fleet turnover, fuel price and emission reductions and indicates that although the magnitude of emission reductions could vary, the Program would result in an overall net emission reduction. (See Appendix T of the LEV III Staff Report for emission calculation methodologies and Appendix S of the LEV III Staff Report for more detailed emission results related to economic factors.)

Overall, staff believes that consumer response to new vehicle offerings would not negate any of the positive effects on criteria pollutant emissions that are expected to result from the proposed Advanced Clean Cars Program, including resultant upstream emission reductions (as discussed in Section V of the LEV III Staff Report).

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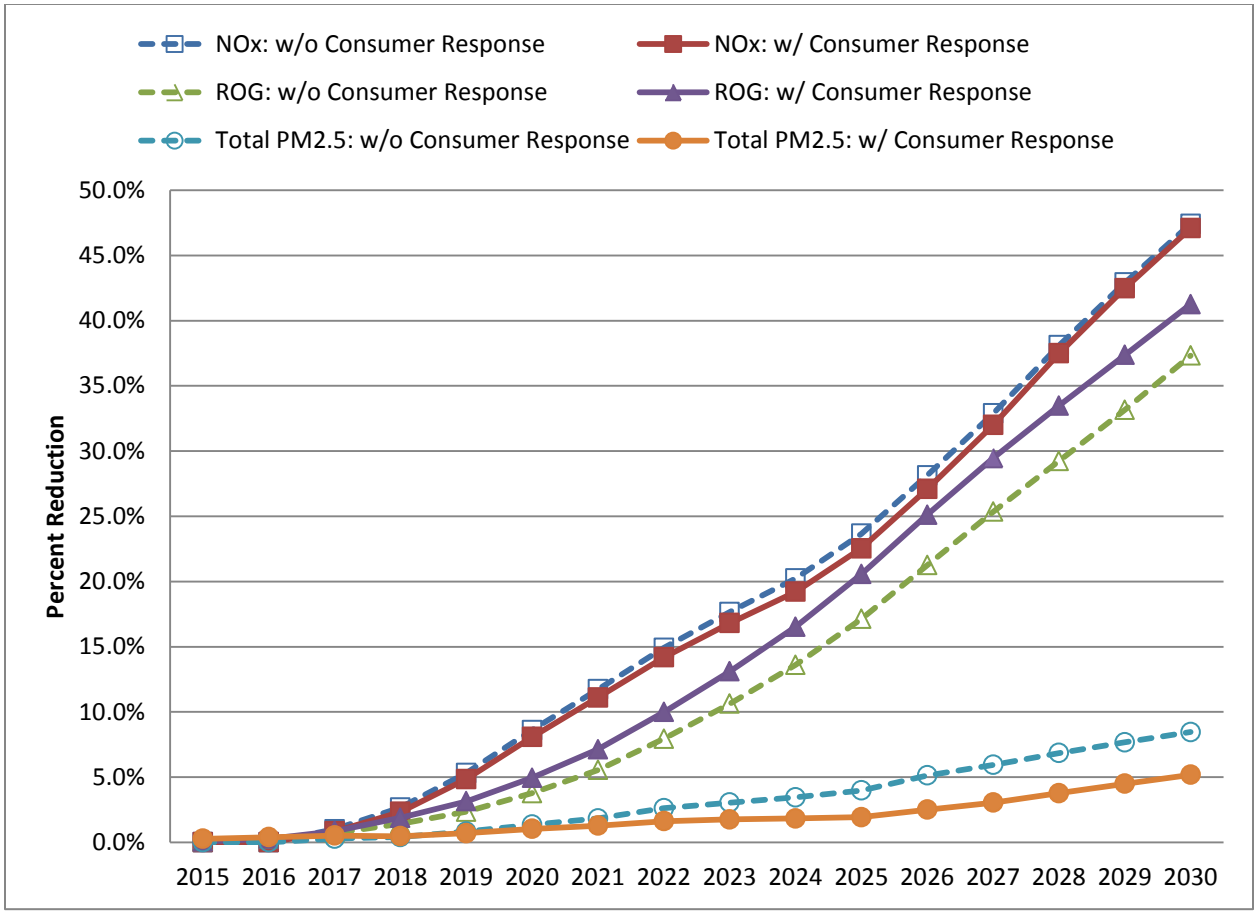
however the CARBITS subset covers an overwhelming majority of vehicles in the on-road fleet and their associated VMT.

Figure 5-1.
Advanced Clean Cars, Changes in ROG, NO_x, and $PM_{2.5}$ Emissions due to Consumer Response (percent)



Mitigation Measure C.1. (Construction)

The Regulatory Setting in Chapter 3 includes, but is not limited to, applicable laws and regulations that provide protection of air quality resources. ARB 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 routinely required to avoid and/or minimize impacts to air resources include:

- Proponents of new or modified facilities constructed as a compliance response to the ACC regulations 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.

- Specifically, apply for, secure, and comply with all appropriate air quality permits for project construction and operations from the local agencies with air quality jurisdiction and from other applicable agencies, if appropriate, prior to construction mobilization.

- Compliance with the CAA and the CCAA (e.g., NSR and BACT criteria if applicable).

- 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.

The proponents and local land use agencies can and should be the parties responsible for the project approval and implementation, its mitigation. ARB is not a land use agency and would not be responsible for ensuring that this mitigation is implemented. However, because of above mitigation are required by law, implementation would reduce this impact to a less-than-significant level.

2. Odors

There is uncertainty as to the exact locations of new manufacturing plants that specialize in the production of propulsion batteries and fuel cells, new hydrogen fueling stations, and modifications to existing hydrogen production plants. However, these would likely occur within existing footprints or in areas with consistent zoning and 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 proposed ACC Program would not include the development of sensitive uses (e.g., residences). Thus, implementation of the proposed ACC Program would not create objectionable odors affecting a substantial number of people. As a result, this impact would be less than significant.

Mitigation

No mitigation is required.

D. Greenhouse Gases

1. Greenhouse Gases; Plan, Policy, or Regulation

As mentioned above in the air quality discussion, the proposed ACC Program would result in an emissions benefit as compared to current regulations. Table 5-4 shows the GHG emission benefits in 2020, 2025, 2035, and 2050. By 2025, CO_2 equivalent emissions would be reduced by almost 14 MMT/yr, which is 12 percent from baseline levels. The reduction increases in 2035 to 32 MMT/Year, a 27 percent reduction from baseline levels. By 2050, the proposed regulation will reduce emissions by more than 42 MMT/yr, a reduction of 33 percent from baseline levels. Viewed cumulatively over the life of the regulation (2017-2050), the proposed ACC Program would reduce emissions by more than 870 MMT CO_2e. With respect to energy, it is also important to note that energy consumption associated with implementation of the proposed ACC Program would displace gasoline (a higher carbon transportation fuel) resulting in additional benefits.

Table 5-4. CO_2-Equivalent (CO_2e) Emission Benefits from Advanced Clean Car Regulations

Statewide CO_2e Emissions (Million Metric Tons / Year)

Calendar Year	**Adjusted Baseline with Rebound**	**Proposed Regulation with Rebound**	**Benefits**	**Percent Reduction**
2020	111.2	108.1	3.1	3%
2025	109.9	96.3	13.7	12%
2035	114.8	83.2	31.5	27%
2050	131.0	88.3	42.7	33%

Mitigation

No mitigation is required.

E. Biological Resources

1. Candidate, Sensitive, or Special Status Species; Riparian Habitat or Sensitive Natural Community; Wetlands; Movement, Local Policies and Ordinances; Plans

As discussed in Chapter 4, Regulated Community Compliance Responses, implementation of the proposed ACC Program could result in the construction and operation of new manufacturing plants that specialize in the production of propulsion

batteries and fuel cells. New hydrogen fueling stations could also be constructed and operated along with modifications to existing hydrogen production plants. These would likely occur within existing footprints or in areas with consistent zoning.

However, there is uncertainty as to the exact locations of these new plants, stations, and modifications, especially in regards to new manufacturing plants for producing propulsion batteries and fuel cells and in relation to the location of biological resources. 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. These activities would have the potential to adversely affect biological resources (e.g., species, 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 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.

Long-term operation of new plants, stations, and modifications would often include the presence of humans; movement of automobiles, trucks and heavy equipment; and operation of stationary equipment. This environment would not be conducive to biological resources located on-site or nearby. The biological resources that could be affected by construction and operation associated with implementation of the proposed ACC Program, would depend on the specific location of each facility and its environmental setting. Harmful effects could include modifications to existing habitat; including removal, degradation, and fragmentation of riparian systems, wetlands, or other sensitive natural wildlife habitat and plan 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. Consequently, this impact would 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 the ARB.

Mitigation Measure E.1.

The Regulatory Setting in Chapter 3 includes, but is not limited to, applicable laws and regulations that provide protection of biological resources. ARB 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 ACC regulations 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.

Because the authority to determine project-level impacts and require project-level mitigation lies with the land use 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, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant impact regarding biological resources resulting from the construction and operation of new plants, stations, and modifications may be significant and unavoidable.

F. Cultural Resources

1. Historic Resources, Archaeological Resources, Paleontological Resources, Unique Geologic Features, Human Remains

As discussed in Chapter 4, Regulated Community Compliance Responses, implementation of the proposed ACC Program could result in the construction and operation of new manufacturing plants that specialize in the production of propulsion batteries and fuel cells. New hydrogen fueling stations could also be constructed and operated along with modifications to existing hydrogen production plants. These would likely occur within existing footprints or in areas with consistent zoning.

However, there is uncertainty as to the exact locations of these new plants, stations, and modifications, especially in regards to new manufacturing plants for producing propulsion batteries and fuel cells and in relation to the location of cultural resources.

The long-term operation of new plants, stations, and modifications would not include any ground disturbance or demolition activities, which are the primary detriments to historical, archaeological, and paleontological resources. However, 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 modifications to existing hydrogen production plants within existing footprints, or at other sites in areas with consistent zoning. As a result, this impact would 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 the ARB.

Mitigation Measure F.1.

The Regulatory Setting in Chapter 3 includes, but is not limited to, applicable laws and regulations that provide protection of cultural resources. ARB 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 ACC regulations 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).

- 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.

- Define the area of potential effect (APE) for each project, which is the area within which project construction and operation may directly or indirectly cause alterations in the character or use of historic properties. The APE should include a reasonable construction buffer zone and laydown areas, access roads, and borrow areas, as well as a reasonable assessment of areas subject to effects from visual, auditory, or atmospheric impacts, or impacts from increased access.

- 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 Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontologic Resources: Standard Procedures (Society of Vertebrate Paleontology 1995).

- 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 should be avoided by moving the site of construction or removing or reducing the need for surface disturbance. The scoping assessment should be conducted by the qualified paleontological resources specialist in accordance with applicable agency requirements.

- The project proponent's qualified paleontological resources specialist would 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 may suggest areas of high known potential for containing resources. If the assessment is inconclusive a surface survey is recommended 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.

Because the authority to determine project-level impacts and require project-level mitigation lies with the land use 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, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant impact regarding cultural resources resulting from the construction and operation of new plants, stations, and modifications may be significant and unavoidable.

G. Geology and Soils

1. Risk of Loss, Injury, or Death; Unstable Geologic Unit or Soil; Expansive Soil

As discussed in Chapter 4, Regulated Community Compliance Responses, implementation of the proposed ACC Program could result in the construction and operation of new manufacturing plants that specialize in the production of propulsion batteries and fuel cells. New hydrogen fueling stations could also be constructed and operated along with modifications to existing hydrogen production plants.

New manufacturing plants and new hydrogen fueling stations 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 plant that 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.

New facilities 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.

New facilities could also be constructed in locations that would expose facilities and structures to expansive soil conditions. Expansive soils, those with high-plasticity clay content, can cause structural failure of the foundations and footings. The presence of expansive soils as defined in Table 18-1-B of the Uniform Building Code (1994) could create substantial risks to life or property. The potential for expansive soils is not well documented in all areas. Therefore, development of new manufacturing plants and new hydrogen fueling stations are potentially 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 a particular manufacturing plant or hydrogen fueling station 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. As a result, this impact would 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 the ARB.

2. Substantial Soil Erosion or the Loss of Topsoil

New plants, stations, and modifications could be located in a variety of geologic, soil, and slope conditions with varying amounts of vegetation that would be susceptible to both soil erosion and loss of topsoil during construction. The level of susceptibility varies by location. However, the specific design details, siting locations, and soil erosion hazards for particular manufacturing plants and hydrogen fueling stations 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, the potential soil erosion hazard impacts would be considered 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 the ARB.

3. Septic Tanks or Alternative Waste Water Disposal Systems

New manufacturing plants would not be anticipated to require the installation or use of septic tanks or alternative waste water disposal systems. Industrial land uses, manufacturing processes in particular, would require more advanced treatment systems that would likely be served by centralized wastewater treatment plants. New hydrogen fueling stations and modifications would not generate waste water and, thus, would not require new waste water treatment disposal systems. In addition, although there is uncertainty as to the exact locations of new plants, stations, and modifications, these would likely occur within existing footprints or in areas with consistent zoning. Consequently, if new hydrogen fueling stations or modification were to result in waste water generation, it could likely be served by an existing waste water treatment plant located in the surrounding urban areas. Therefore, the impacts related to adequately supporting septic tanks or alternative wastewater disposal systems would be less than significant.

Mitigation Measure G.1 and G.2.

The Regulatory Setting in Chapter 3 includes, but is not limited to, applicable laws and regulations that provide protection of geology and soils. ARB 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 ACC regulations 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.

Because the authority to determine project-level impacts and require project-level mitigation lies with the land use 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, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant impact to geology and soils resulting from the construction and operation of new plants, stations, and modifications may be significant and unavoidable.

H. Hazards and Hazardous Materials

1. Routine Transport, Use, or Disposal of Hazardous Materials

As discussed in Chapter 4, Regulated Community Compliance Responses, implementation of the proposed ACC Program could result in the construction and operation of new manufacturing plants that specialize in the production of propulsion batteries and fuel cells. New hydrogen fueling stations could also be constructed and operated along with modifications to existing hydrogen production plants. These would likely occur within existing footprints or in areas with consistent zoning.

The long-term operation of new plants, stations, and modifications would result in the routine transport, use, and disposal of hazardous materials (i.e., propulsion batteries, fuel cells, and hydrogen). However, as discussed in Chapter 5, Regulated Community Compliance Responses, the transport, use, and disposal of hazardous materials would be required to comply with all applicable federal, State and local laws. In addition, although there is uncertainty as to the exact locations of these new plants, stations, and modifications, these would likely occur within existing footprints or in areas with consistent zoning where hazardous materials are currently in use. As a result, this impact would be less than significant.

2. Upset and Accident Conditions

Implementation of the proposed ACC Program would result in mass reductions in regards to the heavier vehicle classes. There are recent studies that analyze the relationship between vehicle weight, size (wheelbase, track width, and their product, footprint), and safety, for individual vehicle makes and models. Based on these studies, the principal difference between the heavier vehicles, especially truck-based LTVs, and the lighter vehicles, especially passenger cars, is that mass reduction has a different effect in collisions with another car or LTV. When two vehicles of unequal mass collide, the delta V is higher in the lighter vehicle, in the same proportion as the mass ratio. As a result, the fatality risk is also higher. Removing some mass from the heavy vehicle reduces delta V in the lighter vehicle, where fatality risk is high, resulting in a large benefit, offset by a small penalty because delta V increases in the heavy vehicle, where fatality risk is low – adding up to a net societal benefit. It is also important to note that once differences in vehicles, drivers and crash times/locations are accounted for, there is essentially no correlation between vehicle mass and US fatality risk per VMT (Wenzel 2011).

Also, with regards to battery fires and/or explosions, there are existing propulsion battery system safety documents that define evaluation methods and make recommendations for battery system performance. The SAE Standard defines a minimum set of acceptable safety criteria for a lithium-based rechargeable battery system to be considered for use in a vehicle propulsion application as an energy storage system connected to a high voltage power train. The purpose of the SAE Standard is to assure that a battery pack can safely be integrated into an electric or

hybrid vehicle. Specifically, it is designed to assure that a single point fault will not result in fire, explosion, battery enclosure rupture or high voltage hazard.

However, construction activities would 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 as they are not designed for use on public roadways. Thus, such maintenance uses a service vehicle that mobilizes to the location of the construction equipment. It is during the transfer of fuel that the potential for an accidental release is most likely. Although precautions would be taken to ensure that any spilled fuel is properly contained and disposed, and such spills are typically minor and localized to the immediate area of the fueling (or maintenance), the potential still remains for a significant release of hazardous materials into the environment. 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, this impact would 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 the ARB.

3. Hazardous Emissions, Materials, or Substances Near Schools, Hazardous Material Site, Airport Land Use Plan, Private Airstrip, Emergency Response Plan or Emergency Evacuation Plan, Wildland Fires

As discussed above, although there is uncertainty as to the exact locations of these new plants, stations, and modifications, these would likely occur within existing footprints or in areas with consistent zoning where hazardous materials are currently in use. Thus, implementation of the proposed ACC Program would not be anticipated to result in locating new plants, stations, or modifications near schools, public (or public use) airports, private airstrips, or wildlands; or on sites included on a list of hazardous materials sites or impair implementation of or physically interfere with an adopted emergency response or evacuation plan. In addition, as noted above, the handling of hazards materials would be required to comply with all applicable federal, State and local laws. As a result, this impact would be less than significant.

Mitigation Measure H.2.

The Regulatory Setting in Chapter 3 includes, but is not limited to, applicable laws and regulations in regards to hazards. ARB 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 upset and accident-related impacts include:

- Proponents of new or modified facilities constructed as a compliance response to the ACC regulations 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.

- Handling of potentially hazardous materials/wastes should be performed 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 would 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 should be in areas away from sensitive receptors such as schools or residential areas. These areas should 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 come into contact with potentially hazardous materials/wastes will have the appropriate health and safety training commensurate with the anticipated level of exposure.

Because the authority to determine project-level impacts and require project-level mitigation lies with the land use 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, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant impact regarding upset and accident-related hazards resulting from the construction and operation of new plants, stations, and modifications may be significant and unavoidable.

I. Hydrology and Water Quality

1. Water Quality Standards or Waste Discharge Requirements; Groundwater Supplies or Groundwater Recharge; Runoff Water

As discussed in Chapter 4, Regulated Community Compliance Responses, implementation of the proposed ACC Program could result in the construction and operation of new manufacturing plants that specialize in the production of propulsion batteries and fuel cells. New hydrogen fueling stations could also be constructed and operated along with modifications to existing hydrogen production plants. These would likely occur within existing footprints or in areas with consistent zoning.

The long-term 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). With respect to depleting groundwater supplies, impairing quality, and runoff issues, new facilities would not be anticipated to result in substantial demands due to the nature of associated activities. As a result, this impact would be less than significant.

2. Drainage Patterns; Flood Hazards; Seiche, Tsunami, or Mudflow

As discussed in Chapter 4, Regulated Community Compliance Responses, implementation of the proposed ACC Program could result in the construction and operation of new manufacturing plants that specialize in the production of propulsion batteries and fuel cells. New hydrogen fueling stations would also be constructed and operated along with modifications to existing hydrogen production plants. These would likely occur within existing footprints or in areas with consistent zoning.

New plants, stations, and modifications could be located in a variety of conditions with regards to altering drainage patters, flooding, and inundation by seiche, tsunami, or mudflow. The level of susceptibility varies by location. However, 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 this analysis, these potential hydrology and water quality-related impacts would be considered 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 the ARB.

Mitigation Measure I.2.

The Regulatory Setting in Chapter 3 includes, but is not limited to, applicable laws and regulations in regards to hydrology and water quality. ARB 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 mitigate hydrology and water quality-related impacts include:

- Proponents of new or modified facilities constructed as a compliance response to the ACC regulations 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.

Because the authority to determine project-level impacts and require project-level mitigation lies with the land use 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, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant impact regarding hydrology and water quality resulting from the construction and operation of new plants, stations, and modifications may be significant and unavoidable.

J. Land Use Planning

1. Divide an Established Community, Land Use Plan, Habitat Conservation Plan or Natural Conservation Plan

As discussed in Chapter 4, Regulated Community Compliance Responses, implementation of the proposed ACC Program could result in the construction and operation of new manufacturing plants that specialize in the production of propulsion batteries and fuel cells. New hydrogen fueling stations could also be constructed and operated along with modifications to existing hydrogen production plants. These would likely occur within existing footprints or in areas with consistent zoning. Thus, implementation of the proposed ACC Program would not be anticipated to divide an established community or conflict with a land use or conservation plan. This impact would be less than significant.

Mitigation

No mitigation is required.

K. Mineral Resources

1. Availability of a Known Mineral Resource or Recovery Site

As discussed in Chapter 4, Regulated Community Compliance Responses, implementation of the proposed ACC Program could result in the construction and operation of new manufacturing plants that specialize in the production of propulsion batteries and fuel cells. New hydrogen fueling stations could also be constructed and operated along with modifications to existing hydrogen production plants. These would likely occur within existing footprints or in areas with consistent zoning where original permitting and analyses considered these issues. In addition, implementation of the proposed ACC Program would not significantly deplete the supply of lithium or platinum and both are currently used in auto manufacturing processes. As a result, this impact would be less than significant.

Mitigation

No mitigation is required.

L. Noise

1. Noise Levels in Excess of Standards, Excessive Groundborne vibration or Groundborne Noise Levels, Substantial Increases in Ambient Noise Levels

Construction noise levels in the vicinity of new plants, stations, and modifications would fluctuate depending on the particular type, number, size, and duration of usage for the varying equipment. The effects of construction noise largely depend on the type of construction activities occurring on any given day, noise levels generated by those activities, distances to noise sensitive receptors, and the existing ambient noise environment in the receptor's vicinity. Construction generally occurs in several discrete stages, each phase requiring a specific complement of equipment with varying equipment type, quantity, and intensity. These variations in the operational characteristics of the equipment change the effect they have on the noise environment of the project site and in the surrounding community for the duration of the construction process.

To assess noise levels associated with the various equipment types and operations, construction equipment can be considered to operate in two modes, mobile and stationary. Mobile equipment sources move around a construction site performing tasks in a recurring manner (e.g., loaders, graders, dozers). Stationary equipment operates in a given location for an extended period of time to perform continuous or periodic operations. Operational characteristics of heavy construction equipment are

additionally typified by short periods of full-power operation followed by extended periods of operation at lower power, idling, or powered-off conditions.

Additionally when construction-related noise levels are being evaluated, activities that occur during the more noise-sensitive evening and nighttime hours are of increased concern. 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 of the on-site equipment associated with grading, compacting, and excavation, which uses the noisiest types of construction equipment. Site preparation equipment and activities include backhoes, bulldozers, loaders, and excavation equipment (e.g., graders and scrapers). Construction of large structural elements and mechanical systems could require the use of a crane for placement and assembly tasks, which may also generate noise levels. Although a detailed construction equipment list is not currently available, based on this project type it is expected that the primary sources of noise would include backhoes, bulldozers, and excavators. Noise emission levels from typical types of construction equipment can range from approximately 74 to 94 dBA at 50 feet.

Based on this information and accounting for typical usage factors of individual pieces of equipment and activity types, on-site construction could result in hourly average noise levels of 87 dBA L_{eq} at 50 feet and maximum noise levels of 90 dBA L_{max} at 50 feet from the simultaneous operation of heavy-duty equipment and blasting activities, if deemed necessary. 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 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 VdB and from 0.003 to 0.089 in/sec 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 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) at 25 feet, respectively. 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.

With respect to operational-related transportation activities, new plants, stations, and modifications would not be anticipated to result in a doubling of ADT volumes on affected roadway segments (e.g., the amount associated with a substantial traffic noise increase as discussed above). However, new plants, stations, and modifications, could introduce new on-site stationary noise sources (e.g., pumps, motors, compressors, fans, generators, and other equipment). Noise levels associated with these types of sources vary greatly, but would generally range from 70 dBA L_{eq} to 80 dBA L_{max} at 50 feet. Based on these and general attenuation rates, exterior noise levels at noise-sensitive receptors located within hundreds of feet from the location of the project sites could exceed typical 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). Thus, implementation of the proposed ACC Program could result in the generation of short-term construction noise and long-term stationary 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. As a result, this impact would 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 the ARB.

2. People Residing or Working in the Area to Excessive Airport-Related Noise Levels

As discussed above, although there is uncertainty as to the exact locations of these new plants, stations, and modifications, these would likely occur within existing footprints or in areas with consistent zoning. Thus, implementation of the proposed ACC Program would not be anticipated to result in locating new plants, stations, or modifications near existing public (or public use) airports or private airstrips. In addition, implementation of the proposed ACC Program would not result in any housing placement or substantial increases in airport-activities. As a result, this impact would be less than significant.

Mitigation Measure L.1.

The Regulatory Setting in Chapter 3 includes, but is not limited to, applicable laws and regulations that pertain to noise. ARB 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 noise include:

- Proponents of new or modified facilities constructed as a compliance response to the ACC regulations 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.

- Consider use of battery powered forklifts and other facility vehicles.

- 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.

- 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.

Because the authority to determine project-level impacts and require project-level mitigation lies with the land use 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, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant impact regarding noise resulting from the construction and operation of new plants, stations, and modifications may be significant and unavoidable.

M. Population and Housing

1. Population Growth, Displace Housing or People

As discussed in Chapter 4, Regulated Community Compliance Responses, implementation of the proposed ACC Program could result in the construction and operation of new manufacturing plants that specialize in the production of propulsion batteries and fuel cells. New hydrogen fueling stations could also be constructed and operated along with modifications to existing hydrogen production plants. Construction activities would be anticipated to require relatively small crews as new plants, stations, and modifications would likely occur within existing footprints or in areas with consistent zoning. In addition, demand for 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 and that a sufficient construction employment base would likely be available. 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 because these would likely occur within existing footprints or in areas with consistent zoning. Therefore, this impact would be less than significant.

Mitigation

No mitigation is required.

N. Public Services

1. Response Time for Fire Protection, Police Protection, Schools, Parks, and Other Facilities

As discussed in Chapter 4, Regulated Community Compliance Responses, implementation of the proposed ACC Program could result in the construction and operation of new manufacturing plants that specialize in the production of propulsion batteries and fuel cells. New hydrogen fueling stations could also be constructed and operated along with modifications to existing hydrogen production plants. Construction activities would be anticipated to require relatively small crews as new plants, stations, and modifications would likely occur within existing footprints or in areas with consistent zoning. In addition, demand for 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 and that a sufficient construction employment base would likely be available. 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 because these would likely occur within existing footprints or in areas with consistent zoning. Implementation of the proposed ACC Program would not require new additional housing or land use types that do not currently exist in the area; therefore, not affecting the provision of public services. As a result, this impact would be less than significant.

Mitigation

No mitigation is required.

O. Recreation

1. Regional Parks or Other Recreational Facilities

As discussed in Chapter 4, Regulated Community Compliance Responses, implementation of the proposed ACC Program could result in the construction and operation of new manufacturing plants that specialize in the production of propulsion batteries and fuel cells. New hydrogen fueling stations could also be constructed and operated along with modifications to existing hydrogen production plants. Construction activities would be anticipated to require relatively small crews as new plants, stations, and modifications would likely occur within existing footprints or in areas with consistent zoning. In addition, demand for 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 and that a sufficient construction employment base would likely be available. 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 because these would likely occur within existing footprints or in areas with consistent zoning. Thus, implementation of the proposed ACC Program 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, new (or expansion of) recreational-related facilities would not occur; therefore, not physically affecting the environment. As a result, this impact would be less than significant.

Mitigation

No mitigation is required.

P. Transportation/Traffic

1. Performance of Circulation System; Congestion Management Programs; Air Traffic Patterns; Hazards; Emergency Access, Policies, Plans and Programs

a. Construction Impacts

Although detailed information about specific construction activities is not currently available, new plants, stations and modifications would be anticipated to result in short-term construction traffic (primarily motorized) from 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 a result, this impact would 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 the ARB.

b. Operational Impacts

With respect to operational-related activities, 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 because these would likely occur within existing footprints or in areas with consistent zoning. In addition, as discussed in Chapter 4, Regulated Community Compliance Responses, deliveries associated with long-term operational activities (e.g., hydrogen deliveries) would not be anticipated to result in a substantial number of new trips (or associated VMT). Thus, implementation of the proposed ACC Program would not be anticipated to result in substantial traffic volumes on local roadways and; therefore, would not generate long-term operational traffic that conflicts with applicable programs, plans, ordinances, or policies; result in a change in air traffic patterns; substantially increase hazards due to design features; or result in inadequate emergency access. As a result, this impact would be less than significant.

Mitigation Measure P.1. (Construction)

The Regulatory Setting in Chapter 3 includes, but is not limited to, applicable laws and regulations in regards to transportation. ARB 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 construction traffic impacts include:

- Proponents of new or modified facilities constructed as a compliance response to the ACC regulations 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. Identify road design requirements for any proposed roads, and related road improvements.

- If new roads are necessary prepare a road siting plan and consult standards contained in federal, State, or local requirements. The plans should include design and construction protocols to ensure roads will meet the appropriate standards and be no larger than necessary to accommodate their intended functions (e.g., traffic volume and weight of vehicles). Access roads should be located to avoid or minimize impacts to washes and stream crossings, follow natural contours and minimize side-hill cuts. Roads internal to a project site should be designed to minimize ground disturbance. Excessive grades on roads, road embankments, ditches, and drainages should be avoided, especially in areas with erodible soils.

- Prepare a Construction Traffic Control Plan and a Traffic Management Plan.

Because the authority to determine project-level impacts and require project-level mitigation lies with the land use 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, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant impact regarding traffic resulting from the construction of new plants, stations, and modifications may be significant and unavoidable.

Q. Utilities and Service Systems

1. Water Supply, Wastewater Treatment, and Storm Water, and Solid Waste Infrastructure

As discussed in Chapter 4, Regulated Community Compliance Responses, implementation of the proposed ACC Program could result in the construction and operation of new manufacturing plants that specialize in the production of propulsion batteries and fuel cells. New hydrogen fueling stations could also be constructed and operated along with modifications to existing hydrogen production plants.

As discussed in Chapter 4, Regulated Community Compliance Responses, new hydrogen fueling stations would likely be located 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. Additionally, the demand for these utilities and services from hydrogen fueling stations would be minimal and not be unlike the demand from existing gasoline service stations. 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 associated environmental impacts.

New manufacturing plants, however, could generate substantial increases in the demand for water supply, wastewater treatment, storm water drainage, and solid waste services in their local areas. These new facilities, no matter their size and location would be required to seek local land use approvals prior to their development. 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 State 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, 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 ARB including: economic costs, product demands, environmental constraints, and other market constraints. Thus, the specific impacts from new manufacturing plants on utility and service systems cannot be identified with any certainty, and individual plants could potentially result in significant environmental impacts for which it is unknown whether mitigation would be available to reduce the impacts to a less-than-significant level. Thus, for purposes of this analysis, this impact is considered 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 the ARB.

Mitigation Measure Q.1.

The Regulatory Setting in Chapter 3 includes, but is not limited to, applicable laws and regulations that related to utilities and service systems. ARB 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 utility and service-related impacts include:

- Proponents of new or modified facilities constructed as a compliance response to the ACC regulations 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.

Because the authority to determine project-level impacts and require project-level mitigation lies with the land use 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, this EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant impact to utilities and service systems resulting from the construction and operation of new plants and modifications to existing plants may be significant and unavoidable.

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6.0 CUMULATIVE AND GROWTH-INDUCING IMPACTS

Cumulative impacts are impacts on the environment that result from the incremental impacts of a proposed project when added to other past, present, and reasonably foreseeable future actions (CEQA Guidelines, CCR, Title 14, Section 15355[b]). Such impacts can result from individually minor, but collectively significant actions taking place over time. CEQA Guidelines, CCR, Title 14, Section 15130 states that the discussion of cumulative impacts need not provide as much detail as the discussion of effects attributable to the project alone.

Recognizing the programmatic nature of the EA, cumulative impacts for resource topics are disclosed in general qualitative terms as they pertain to reasonably foreseeable compliance responses. The State CEQA Guidelines require that cumulative impacts be addressed when the cumulative impacts are expected to be significant and when the project's incremental contribution to the effect is cumulatively considerable (CEQA Guidelines, CCR, Title 14, Section 15130[a]). 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. EIRs must consider "other projects creating related impacts." (CEQA Guidelines, CCR, Title 14, Section 15130[a][1]). CEQA Guidelines, CCR, Title 14, Section 15355(b) requires an analysis of "other closely related past, present, and reasonably foreseeable probable future projects". ARB is, accordingly, considering in the cumulative impacts analysis of other projects that, like the proposed ACC Program, are designed to *reduce* annual emissions of CAPs and GHGs, and not simply every project that emits CAPs or GHGs. This approach is "guided by the standards of practicality and reasonableness" (CEQA Guidelines, CCR, Title 14, 15130[b]) and serves the purposes of the cumulative impacts analysis, which is to provide "a context for considering whether the incremental effects of the project at issue are considerable" when judged "against the backdrop of the environmental effects of other projects." (CBE v. Cal. Res. Agency [2002] 103 Cal.App.4th 98, 119).

The level of detail in this section has been guided by what is practical and reasonable, and contains the following elements:

- An analysis of related future projects or planned regulatory programs that would affect resources in the project area similar to those affected by the proposed project;

- A summary of the expected environmental effects to be produced by those reasonably foreseeable future projects with specific reference to additional information stating where that information is available; and

- A reasonable analysis of the cumulative impacts of the relevant projects. An environmental document must examine reasonable feasible options for mitigating or avoiding the project's contribution to any significant cumulative effects.

Due to the statewide reach of the proposed ACC Program and the longer-term future horizon for the reduction achievements, the impact analysis is inherently cumulative in nature, rather than site or project specific. As a result the character of impact conclusions in the resource-oriented sections of Chapter 5 are cumulative, considering the potential effects of the full range of reasonably foreseeable methods of compliance, along with expected background growth in California, as appropriate.

This section evaluates the cumulative and growth-inducing impacts associated with implementation of the proposed ACC Program and the potential contribution of the program to those impacts. The impact assessment discusses each resource topic evaluated in this EA.

A. Aesthetics

There is uncertainty as to the exact locations of new plants, stations, and modifications, especially in regards to new manufacturing plants for producing propulsion batteries and fuel cells and in relation to the location of viewers. Construction and operation of these, though likely to occur in areas with consistent zoning, could introduce or increase the presence of artificial elements (e.g., heavy-duty equipment, removal of existing vegetation, buildings) 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 size of facilities, viewing distance, angle of view, visual absorption capacities, and the structure placement in the landscape. Operation may introduce substantial sources of nighttime lighting for safety and security purposes. Implementation of Mitigation Measure A.1. would not reduce these impacts to a less-than-significant level. Thus, the proposed ACC Program could result in a considerable contribution to a cumulative aesthetics-related impact.

B. Agriculture and Forestry Resources

Implementation of the proposed ACC Program could result in the construction and operation of new manufacturing plants that specialize in the production of propulsion batteries and fuel cells. New hydrogen fueling stations would also be constructed and operated along with modifications to existing hydrogen production plants. There is uncertainty as to the exact locations of these new plants, stations, and modifications, especially in regards to new manufacturing plants for producing propulsion batteries and fuel cells; however, these would likely occur within existing facility footprints or in areas with consistent zoning. Thus, implementation of the proposed ACC Program would not be anticipated to result in the conversion of farmland, conflict with existing zoning for agricultural use or a Williamson Act contract, conflict with existing zoning for (or cause rezoning of) forest land or timberland, the loss of forest land (or conversion of forest land to non-forest use), or involve other changes resulting in conversion of farmland or forest land to non-agricultural use or non-forest use, respectively. Thus, the proposed ACC Program would not result in a considerable contribution to a cumulative agriculture-related impact.

C. Air Quality

A majority of California is designated as a nonattainment area for ozone and PM_{10}, and to a lesser degree for $PM_{2.5}$, and areas with high levels of TACs. As described in above in Chapter 5, future projects associated with implementation of proposed ACC Program and other cumulative development projects 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 and through this process, air quality levels and associated exposure of sensitive receptors would be calculated and resulting impacts would be determined. With respect to long-term operational emissions, implementation of the proposed ACC Program would result in a beneficial impact.

However, depending on the specific location, type, and number, construction activities could generate short-term emissions that conflict with applicable air quality plans, or violate or contribute substantially to an existing or projected violation. Additionally, implementation could also result in the exposure of sensitive receptors to substantial pollutant concentrations. Implementation of Mitigation Measure C.1. (Construction) would reduce these impacts to a less-than-significant level. Thus, all potentially significant air quality impacts associated with the implementation of the proposed ACC Program would be reduced to a less-than-significant level with mitigation and would not result in a considerable contribution to a cumulative air quality impact.

D. Greenhouse Gases

The proposed ACC Program would result in an emissions benefit as compared to current regulations. Table 5-4 shows the GHG emission benefits in 2020, 2025, 2035, and 2050. By 2025, CO_2 equivalent emissions would be reduced by almost 14 MMT/yr, which is 12 percent from baseline levels. The reduction increases in 2035 to 32 MMT/Year, a 27 percent reduction from baseline levels. By 2050, the proposed regulation will reduce emissions by more than 42 MMT/yr, a reduction of 33 percent from baseline levels. Viewed cumulatively over the life of the regulation (2017-2050), the proposed ACC Program would reduce emissions by more than 870 MMT CO_2e. Thus, the proposed ACC Program would not result in a considerable contribution to a cumulative GHG-related impact.

E. Biological Resources

There is uncertainty as to the exact locations of these new plants, stations, and modifications, especially in regards to new manufacturing plants for producing propulsion batteries and fuel cells and in relation to the location of biological resources. 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. These activities would have the potential to adversely affect biological resources (e.g., species, 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 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. Long-term operation of new plants, stations, and modifications would often include the presence of humans; movement of automobiles, trucks and heavy equipment; and operation of stationary equipment. This environment would not be conducive to biological resources located on-site or nearby.

The biological resources that could be affected by construction and operation associated with implementation of the proposed ACC Program, would depend on the specific location of each facility and its environmental setting. Harmful effects could include modifications to existing habitat; including removal, degradation, and fragmentation of riparian systems, wetlands, or other sensitive natural wildlife habitat and plan 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 Measure E.1. would not reduce these impacts to a less-than-significant level. Thus, the proposed ACC Program could result in a considerable contribution to a cumulative biology-related impact.

F. Cultural Resources

There is uncertainty as to the exact locations of these new plants, stations, and modifications, especially in regards to new manufacturing plants for producing propulsion batteries and fuel cells and in relation to the location of cultural resources. The long-term operation of new plants, stations, and modifications would not include any ground disturbance or demolition activities, which are the primary detriments to historical, archaeological, and paleontological resources. However, 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 modifications to existing

hydrogen production plants within existing footprints, or at other sites in areas with consistent zoning. Implementation of Mitigation Measure F.1. would not reduce these impacts to a less-than-significant level. Thus, the proposed ACC Program could result in a considerable contribution to a cumulative cultural resource-related impact.

G. Geology and Soils

As discussed in Chapter 5, new manufacturing plants would not be anticipated to require the installation or use of septic tanks or alternative waste water disposal systems, but rather likely be served by centralized wastewater treatment plants. New hydrogen fueling stations and modifications would not generate waste water and, thus, would not require new waste water treatment disposal systems. However, new manufacturing plants and new hydrogen fueling stations could be located in a variety of relatively high-risk geologic and soil conditions that are considered to be potentially hazardous. New facilities could be located in a variety of geologic, soil, and slope conditions with varying amounts of vegetation that would be susceptible to soil erosion and the loss of topsoil during construction. New facilities could also be constructed in locations that would expose facilities and structures to expansive soil conditions. 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; or result in substantial soil erosion or the loss of topsoil. 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. Implementation of Mitigation Measure G.1. and G.2. would not reduce these impacts to a less-than-significant level. Thus, the proposed ACC Program could result in a considerable contribution to a cumulative geology and soils-related impact.

H. Hazards and Hazardous Materials

As discussed in Chapter 5, the long-term operation of new plants, stations, and modifications would result in the routine transport, use, and disposal of hazardous materials (i.e., propulsion batteries, fuel cells, and hydrogen); however, such would be required to comply with all applicable federal, State and local laws. Implementation of the proposed ACC Program would not be anticipated to result in locating new plants, stations, or modifications near schools, public (or public use) airports, private airstrips, or wildlands; or on sites included on a list of hazardous materials sites or impair implementation of or physically interfere with an adopted emergency response or evacuation plan. In addition, as noted above, the handling of hazards materials would be required to comply with all applicable federal, State and local laws; and, although there is uncertainty as to the exact locations of these new plants, stations, and modifications, these would likely occur within existing footprints or in areas with consistent zoning where hazardous materials are currently in use. Implementation of the proposed ACC Program would result in mass reductions in regards to the heavier vehicle classes. When two vehicles of unequal mass collide, the delta V is higher in the lighter vehicle, in the same proportion as the mass ratio. As a result, the fatality risk is

also higher. Removing some mass from the heavy vehicle reduces delta V in the lighter vehicle, where fatality risk is high, resulting in a large benefit, offset by a small penalty because delta V increases in the heavy vehicle, where fatality risk is low – adding up to a net societal benefit. It is also important to note that once differences in vehicles, drivers and crash times/locations are accounted for, there is essentially no correlation between vehicle mass and US fatality risk per VMT (Wenzel 2011). Also, with regards to battery fires and/or explosions, there are existing propulsion battery system safety documents that define evaluation methods and make recommendations for battery system performance. However, 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 primarily related to construction activities as discussed in Chapter 5. Implementation of Mitigation Measure H.2. would not reduce these impacts to a less-than-significant level. Thus, the proposed ACC Program could result in a considerable contribution to a cumulative hazards-related impact.

I. Hydrology and Water Quality

The long-term 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). With respect to depleting groundwater supplies, impairing quality, and runoff issues, new facilities would not be anticipated to result in substantial demands due to the nature of associated activities. However, new plants, stations, and modifications could be located in a variety of conditions with regards to altering drainage patters, flooding, and inundation by seiche, tsunami, or mudflow. Implementation of Mitigation Measure I.2. would not reduce these impacts to a less-than-significant level. Thus, the proposed ACC Program could result in a considerable contribution to a cumulative hydrology and water quality-related impact.

J. Land Use Planning

New hydrogen fueling stations would also be constructed and operated along with modifications to existing hydrogen production plants. These would likely occur within existing footprints or in areas with consistent zoning. Thus, implementation of the proposed ACC Program would not be anticipated to divide an established community or conflict with a land use or conservation plan. Thus, the proposed ACC Program would not result in a considerable contribution to a cumulative land use planning-related impact.

K. Mineral Resources

New hydrogen fueling stations would also be constructed and operated along with modifications to existing hydrogen production plants. These would likely occur within existing footprints or in areas with consistent zoning where original permitting and analyses considered these issues. In addition, as discussed in Chapter 4, Regulated Community Compliance Responses, implementation of the proposed ACC Program

would not significantly deplete the supply of lithium or platinum and both are currently used in auto manufacturing processes. Thus, the proposed ACC Program would not result in a considerable contribution to a cumulative mineral resources-related impact.

L. Noise

As discussed above, although there is uncertainty as to the exact locations of these new plants, stations, and modifications, these would likely occur within existing footprints or in areas with consistent zoning. Thus, implementation of the proposed ACC Program would not be anticipated to result in locating new plants, stations, or modifications near existing public (or public use) airports or private airstrips. In addition, implementation of the proposed ACC Program would not result in any housing placement or substantial increases in airport-activities. With respect to operational-related transportation activities, new plants, stations, and modifications would not be anticipated to result in a doubling of ADT volumes on affected roadway segments (e.g., the amount associated with a substantial traffic noise increase as discussed above). However, the construction and operation of new plants, stations, and modifications, could introduce new on-site construction- and stationary- source noise (e.g., heavy-duty construction equipment, pumps, motors, compressors, fans, generators, and other equipment) 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. Implementation of Mitigation Measure L.1. would not reduce these impacts to a less-than-significant level. Thus, the proposed ACC Program could result in a considerable contribution to a cumulative noise-related impact.

M. Population and Housing

Construction activities would be anticipated to require relatively small crews as new plants, stations, and modifications would likely occur within existing footprints or in areas with consistent zoning. In addition, demand for 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 and that a sufficient construction employment base would likely be available. 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 because these would likely occur within existing footprints or in areas with consistent zoning. Thus, the proposed ACC Program would not result in a considerable contribution to a cumulative population and housing-related impact.

N. Public Services

Construction activities would be anticipated to require relatively small crews as new plants, stations, and modifications would likely occur within existing footprints or in areas with consistent zoning. In addition, demand for 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 and that a

sufficient construction employment base would likely be available. 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 because these would likely occur within existing footprints or in areas with consistent zoning. Implementation of the proposed ACC Program would not require new additional housing or land use types that do not currently exist in the area; therefore, not affecting the provision of public services. Thus, the proposed ACC Program would not result in a considerable contribution to a cumulative population and public services-related impact.

O. Recreation

As discussed above, it would be anticipated that the need for a substantial amount of construction worker migration would not occur and that a substantial amount of new personnel would not be needed to operate the facilities. Thus, implementation of the proposed ACC Program 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, new (or expansion of) recreational-related facilities would not occur; therefore, not physically affecting the environment. Thus, the proposed ACC Program would not result in a considerable contribution to a cumulative recreation-related impact.

P. Transportation/Traffic

With respect to operational-related activities, 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 because these would likely occur within existing footprints or in areas with consistent zoning. In addition, deliveries associated with long-term operational activities (e.g., hydrogen deliveries) would not be anticipated to result in a substantial number of new trips (or associated VMT). However, depending on the amount of trip generation associated with construction activities 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 Measure P.1. would not reduce these impacts to a less-than-significant level. Thus, the proposed ACC Program could result in a considerable contribution to a cumulative transportation/traffic-related impact.

Q. Utilities and Service Systems

New hydrogen fueling stations would likely be located 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 and the demand would be minimal and not be unlike the demand from existing gasoline service stations. Thus, such would not be expected to exceed the capacity of the local providers or necessitate an increase

in service capacities and associated infrastructure. However, new manufacturing plants could generate substantial increases in the demand for water supply, wastewater treatment, storm water drainage, and solid waste services in their local areas. Implementation of Mitigation Measure Q.1. would not reduce these impacts to a less-than-significant level. Thus, the proposed ACC Program could result in a considerable contribution to a cumulative utilities and service systems-related impact.

R. Growth-Inducing Impacts

The proposed ACC Program would not directly result in any growth in population or housing. Implementation would support job formation in the affected industries (e.g., manufacturing associated with batteries, advanced clean cars, and material and technology improvements). The job formation would support improved employment in the State, which may indirectly encourage population growth. Any growth would occur over the long-term period of the ACC Program's regulations, which could be accommodated within the normal planning process in California communities, including environmental review. California is renowned for its environmentally progressive laws and regulations, and the proposed ACC Program would contribute to California's effort to improve public health, contribute towards healthy lifestyles and improved quality of life.

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7.0 ALTERNATIVES ANALYSIS

Under ARB's CEQA certified regulatory program, an environmental analysis shall address "feasible alternatives to the proposed action [that] would substantially reduce any significant adverse impact identified" (CCR, Title 17, Section 60005[b]). Additionally, any ARB action or proposal for which significant adverse environmental impacts have been identified shall not be approved or adopted as proposed, if there are "feasible alternatives available [that] would substantially reduce such adverse impact" (CCR, Title 17, Section 60006). CEQA Guidelines, CCR, Title 14, Section 15126.6(a) also indicates the need for an evaluation of "a range of reasonable alternatives to the project, or the location of the project, [that] 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 or not a variation of the proposed project would reduce or eliminate significant project impacts, within the framework of achieving the basic project objectives. The proposed ACC Program could be designed differently, which provides opportunities to define alternatives for the EA analysis. Options for the emission requirements under the LEV regulation, vehicle requirements under the ZEV regulation, and provisions of the CFO regulation are discussed below. No alternatives are discussed for the EPL, on-board diagnostics, or certification fuel components of the LEV regulation, because the proposed amendments to those parts by this regulatory package would not result in any significant impacts to the environment.

A. No Project Alternative

1. Description of the No Project Alternative

CEQA requires a specific alternative of "No Project" to be evaluated. Under the No Project Alternative, amendments would not occur to the existing LEV (including EPL), ZEV, and CFO regulations. Thus, the emission requirements for CAPs in place for model year 2010, the final year of implementation of the existing LEV II regulation, would remain in effect for subsequent model years. The existing requirements of the ZEV regulation would continue without the additional requirement that manufacturers earn a minimum proportion of the required credits by selling AT PZEVs, TZEVs, and PZEVs. The EPL regulation would continue to be required on new cars. In addition, the Pavley regulations would also continue at 2016 model year standard levels.

2. Consistency with Project Objectives

The No Project Alternative would fail to achieve the project objectives listed in Chapter 1, Section C, because enhancements to programs for CAP and GHG reductions necessary to achieve air quality standards and GHG requirements and targets would not occur.

Under the No Project Alternative, ARB would continue to implement other existing programs and regulations intended to reduce emissions of CAPs and GHGs in California, but without the proposed ACC Program. Vehicle emissions of CAPs and GHGs would continue to decrease as the vehicle fleet turns over under the existing LEV and ZEV regulations. This is because, typically, almost all of the State's fleet of light- and medium-duty vehicles turns over in an approximately 15-year cycle. Thus, because 2010 is the last model year addressed by the existing LEV regulation, the vehicle fleet would continue to become incrementally cleaner and more efficient until approximately 2025. After that complete turnover cycle, the emissions efficiency of the vehicle fleet would not improve with subsequent fleet turnover, because new vehicles would no longer be cleaner than the older vehicles they replace. The No Project Alternative would not fulfill the requirement of HSC Section 43018(a), which requires ARB to reduce vehicle emissions of CAPs to the maximum extent feasible. Further, 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.

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. ARB has identified that an additional reduction of 3.8 MMT CO_2e would be needed from light- and medium-duty vehicles to achieve the goals of AB 32, which would be in addition to compliance with the existing LEV and ZEV regulations (ARB 2011b). ARB would attempt to develop and implement other regulations or programs to achieve a reduction a minimum of 3.8 MMT CO_2e; however, it is too speculative at this time to determine whether this reduction could be achieved or when a new regulation would be able to go into effect. Therefore, it is reasonable to conclude that this reduction would not likely be achieved by 2020 with a new regulation or program and California would not achieve the AB 32 mandate.

In addition, implementation of the No Project Alternative would prevent ARB from coordinating with the national Tier 3 standards for CAP emissions that are currently being developed by U.S. EPA, as well as efforts by U.S. EPA and NHTSA to develop GHG standards for light-duty vehicles. For instance, the credit formula that applies to GHG standards for air conditioning systems under the existing Pavley regulation would not align with U.S. EPA's methodology for model years 2017 – 2025. Such inconsistencies between the State and federal requirements would likely result in compliance difficulty and confusion for manufacturers. In addition, Board approval of a "No Project" Alternative would threaten California's nation-leading role in forcing new motor vehicle technology, making it more likely that U.S. EPA and NHTSA could finalize weaker standards than they have proposed, and consequently, would prevent California from achieving needed emission reductions.

Without regulatory requirements, development and use of ZEVs would not increase fast enough to meet ARB's air quality standards and GHG reduction targets. It is unlikely that vehicle manufacturers would increase production of BEVs or hydrogen FCVs 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. Consumers would be expected to hesitate to purchase BEVs and FCVs because of doubts about sufficient availability of charging and fueling stations. Left unchanged, the existing CFO regulation would not require the installation of hydrogen fueling infrastructure until the projected number of vehicles reaches 20,000 FCVs. Once activated, the existing regulation only requires a few oil companies and convenience store and supermarket chains to build the stations, leaving several large oil companies that own smaller numbers of gasoline stations (or no stations) out of the requirement in the early years. Also, with a 20,000 vehicle trigger, hydrogen fueling infrastructure would not be sufficient to support the FCV market before the trigger is reached, making it unlikely that the cumulative total of FCVs in the State would ever reach 20,000 vehicles. Thus, it is uncertain whether any entities would build new hydrogen fueling facilities if vehicle manufacturers do not increase production of hydrogen FCVs. Similarly, it is unlikely that vehicle manufacturers would commit to increasing production of FCVs without having a high level of confidence that the fueling infrastructure would be in place to support the FCVs.

In addition, the EPL would not be changed to be consistent with the federal Fuel Economy and Environment label. Cars sold and leased in California would be required to have both the California EPL and the federal Fuel Economy and Environment label, which would supply different sets of information to consumers and could result in buyer confusion.

In summary, the No Project Alternative would neither meet the objectives of the project, nor create an environmentally advantageous outcome.

3. Environmental Impacts

There would be no new environmental impacts under the No Project Alternative, because compliance responses by vehicle manufacturers and refiners and importers of gasoline would be the same as under the existing regulatory environment.

Because the emission standards under the LEV regulation and the proportion of ZEVs would not change and because the vehicle manufacturing industry has already met these requirements for its 2010 and 2011 vehicle models with existing production facilities, 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 and ZEV credit-qualifying vehicles in the statewide vehicle fleet would likely not increase and, therefore, new hydrogen fueling stations would not be developed under the existing CFO regulation. Thus, no environmental impacts related to new or expanded facilities would occur under the No Project Alternative.

Beneficial impacts resulting from the proposed ACC Program would not occur under the No Project Alternative. This would include reduction of CAPs and GHG beyond what is required under existing regulations and reduction in dependence on conventional petroleum fuels. In addition to failing to meet project objectives, this would put the No

Project Alternative at a substantial environmental disadvantage, compared to the proposed ACC Program.

B. More Stringent Emissions Standards in the Low-Emission-Vehicle and Zero Emission Vehicle Regulations

1. Description of the Alternative

This alternative is referred to as the More Stringent Alternative. It would amend the existing LEV regulation to have more stringent emission standards for light- and medium-duty vehicles for both CAPs and GHGs than the proposed amendments to the ACC Program. More specifically, the standards under this alternative would be more stringent for each model year than those in the proposed ACC Program. While the overall strictness of the standards would increase annually with this alternative, many attributes would be similar to the proposed ACC Program. This includes replacement of separate standards for NMOG and NO_x with a combined standard that would be based on the sum of these two pollutants. A more robust Federal Test Procedure for measuring emissions would still be required and the "durability basis" would still be extended to 150,000 miles to ensure the effectiveness of a vehicle's emissions control systems over the operational life of the vehicle. Also, the California Supplemental Federal Test Procedure (SFTP) would still be extended to more medium-duty vehicles the SFTP (known as SFTP II) and would include standards for exhaust emissions of particulate matter. In addition, evaporative emission standards would still be extended to more vehicle types and to vehicles fueled by gasoline that contains higher percentages of ethanol or other biofuels.

This alternative would amend the ZEV regulation to require manufacturers to earn more ZEV credits than would be required under the proposed ACC Program for model years 2015 to 2025. Amendments to the CFO regulation would be the same as under the proposed project.

2. Consistency with Project Objectives

Because manufacturers would have less time, compared to the proposed ACC Program, to develop more cost-effective innovations that could achieve the more stringent emission standards under this alternative, the production costs of building vehicles that meet these standards would likely be higher and would be passed on to the consumer at the point of sale. Manufacturers have indicated that a more stringent set of standards within this timeframe would be prohibitively expensive, because time is needed to design the necessary innovations and establish production lines. The incremental increase in cost borne by consumers would be greater than under the proposed ACC Program and could result in slower turnover of the statewide fleet. Thus, the emissions reductions realized by requiring lower-emission vehicles would be offset to some degree by the slowdown in vehicle turnover. While overall emissions reductions from the statewide fleet would still be achieved, due to potential fleet turnover delays it is not certain that this alternative would reduce vehicle CAP emissions

to the maximum extent feasible, as required by HSC Section 43018(a). The emissions reduction that would occur would nonetheless help air basins throughout California attain the California and national ambient air quality standards.

For these same reasons, it is also not certain that this alternative would achieve a reduction of 3.8 MMT CO_2e by 2020 that has been identified by ARB in the adopted Scoping Plan as the reduction needed from an ACC Program (ARB 2011b). Thus, California's ability to achieve additional reductions in furtherance of AB 1493 and to attain the GHG reduction goal of AB 32 could be affected, particularly if ARB cannot develop other programs or regulations to reduce GHG emissions in time.

This alternative would achieve the objective to establish a uniform set of vehicle emission standards in California, and would ensure that some emission reductions would occur. In addition, the statewide fleet of light- and medium-duty vehicles would become more fuel efficient and, thus, help the State become less dependent on petroleum as an energy source. However, the degree of this effect is unknown in light of the expected delay in the vehicle fleet turnover, as discussed above.

More specifically, as described Appendix T (LEV III Mobile Source Emissions Inventory Technical Support Document), ARB staff analyzed an alternative scenario that would have accelerated fleet average emission standards by three years to 2022. To reflect the accelerated regulatory scenario, staff assessed the population fraction by technology group and vehicle class that would be sold in each calendar year, by emissions process (e.g., exhaust and evaporative emissions). Tables 2-27 through 2-30 of Appendix T provide, for the accelerated CAPs regulatory scenario, population splits by technology group for each regulated vehicle class. From this analysis, ARB found that an acceleration of three years would provide very small additional emission benefits relative to the proposed ACC program scenario, as shown in Figures 7-1 through 7-4 below.

The proposed ACC Program includes new future-year GHG emission standards that reduce emissions as cleaner vehicles penetrate into the fleet. Because the standards are a fleet mix by calendar year, fleets have the option to comply with them in different ways, and the penetration of ZEV vehicles is one of many ways in which the standards could be met. As a result, ARB staff modeled GHG benefits of the combined program and did not evaluate the tailpipe emission benefits of ZEV apart from the other components of the proposed ACC Program.

As part of this analysis, ARB staff evaluated a more aggressive option, which is consistent with this alternative. Under this more aggressive scenario, emissions would be reduced by 3 percent per year between 2016 and 2025. Using the proposed phase-in schedule for the regulation, ARB staff estimated the percent reduction in CO_2 emission rates by model year for those vehicles subject to the proposed ACC Program. Table 2-35 of Appendix T shows the more stringent alternative GHG standard for new vehicles in California. Figure 7-1 through 7-3 show the proposed ACC Program scenario along with the more stringent alternative (i.e., dashed line).

Figure 7-1. ROG Emissions: Baseline, Proposed, and Accelerated Scenarios

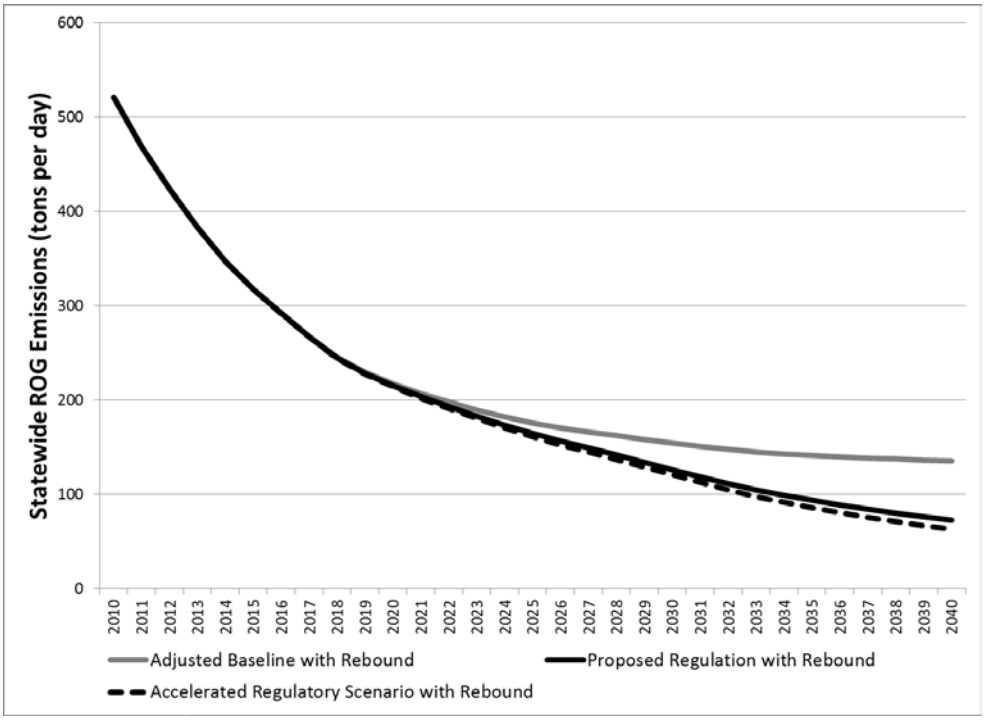


Figure 7-2. NO_x Emissions: Baseline, Proposed, and Accelerated Scenarios

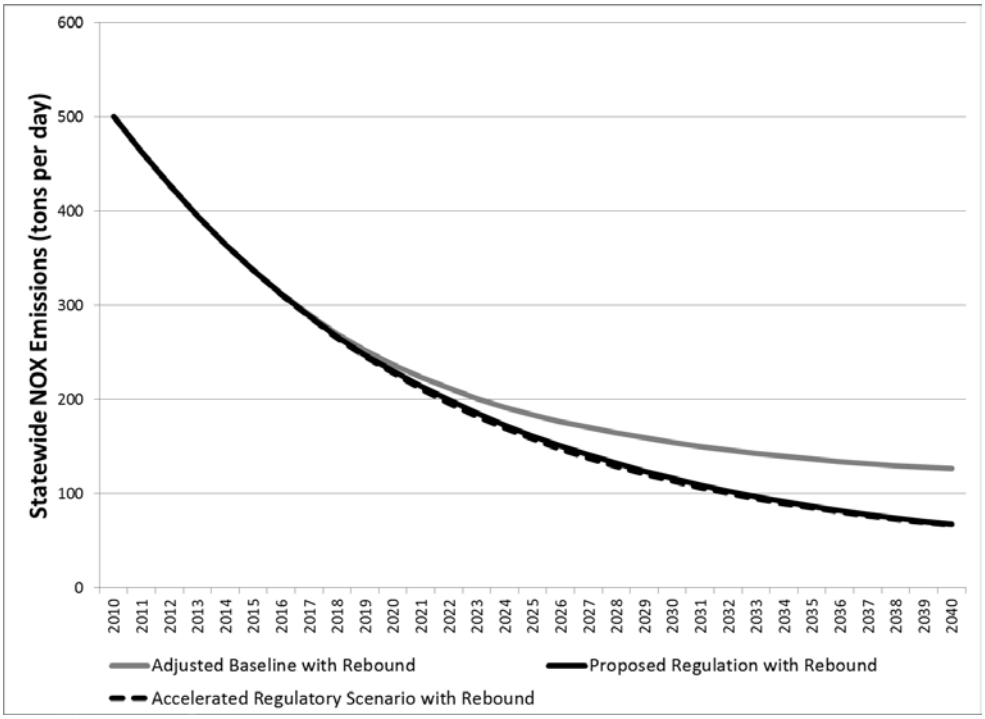


Figure 7-3. CO Emissions: Baseline, Proposed, and Accelerated Scenarios

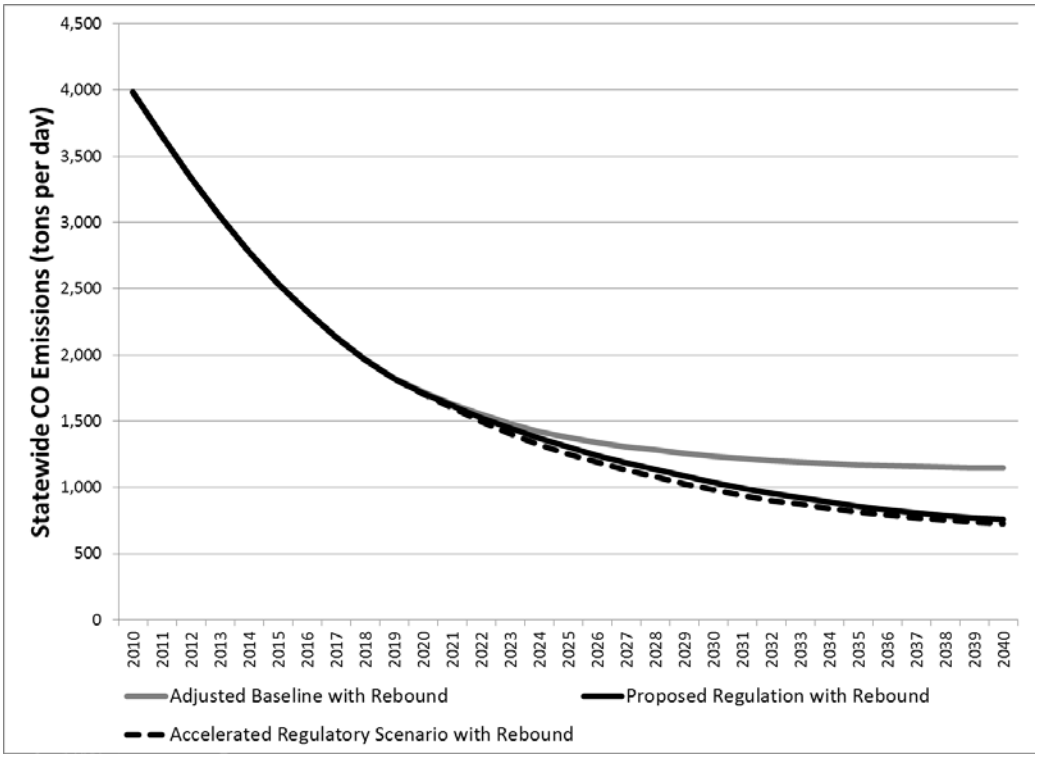
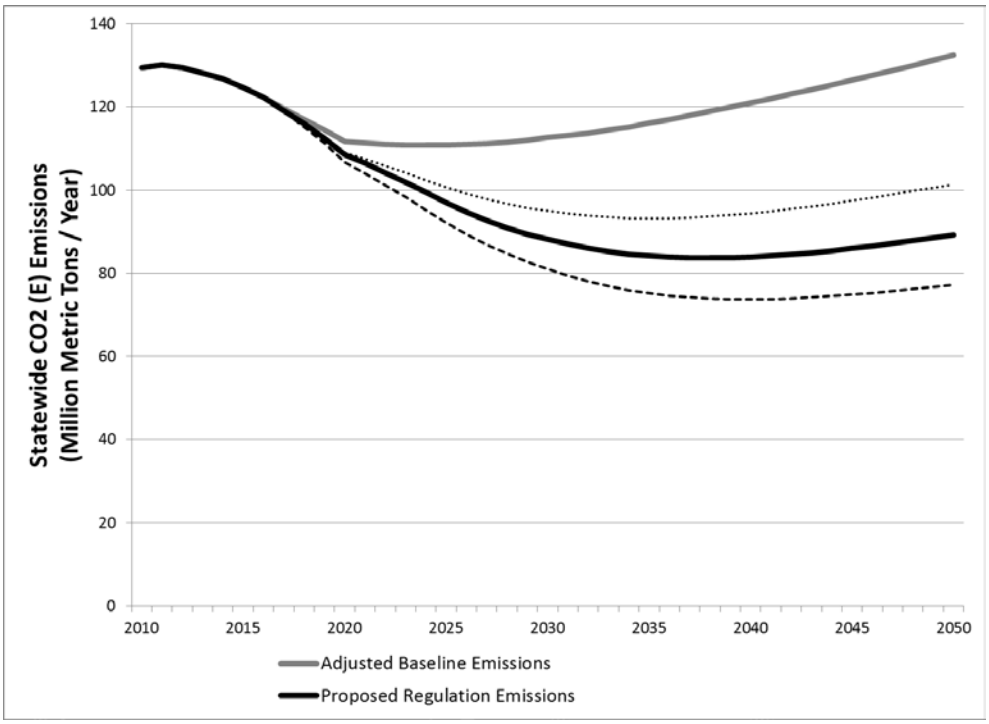


Figure 7-4. Statewide CO_2e Emissions Proposed vs Alternative Greenhouse Gas Regulatory Scenarios (with Rebound)



3. Environmental Impacts

The types of impacts under the More Stringent Alternative would be the same as the proposed amendments to the ACC Program, including potentially significant adverse impacts related to aesthetics, biological resources, cultural resources, geology and soils, hazards and hazardous materials, noise, transportation/traffic, and utilities and service systems. However, because many of the adverse environmental effects would be associated with the development of new or modified manufacturing plants and/or new hydrogen fueling stations, these impacts from compliance responses under the More Stringent Alternative may occur slower as discussed above, but could be greater after complete implementation, than under the proposed ACC Program. This is because the More Stringent Alternative would result in greater penetration of ZEVs and ZEV credit-qualifying vehicles into the statewide vehicle fleet and manufacturers may produce and sell more BEVs and hydrogen FCVs, which earn the highest credit value, to achieve the more requirements of a more stringent ZEV regulation. The More Stringent Alternative could result in more or larger manufacturing plants being constructed, or more intense modifications or expansions to existing plants, and an associated increase in the potential or intensity of those significant adverse impacts identified for the proposed ACC Program in Chapter 6, Impact Analysis and Mitigation. The increase in hydrogen FCVs in the vehicle fleet would then trigger requirements for major refiners and importers of gasoline to build hydrogen fueling stations (i.e., a trigger of 10,000 vehicles within an air basin and 20,000 vehicles statewide). Moreover, the types of environmental impacts associated with the production, distribution, and sale of hydrogen would be the same as for the proposed project with the exception that more hydrogen production and distribution activity and hydrogen fuel outlets would occur. Assuming the trigger level for building required hydrogen fueling stations would occur earlier in time, the impact associated with construction and operation of these stations may be experienced earlier as well.

Beneficial air quality, GHG, and energy effects would be anticipated to be greater overall, but could occur at a slower pace.

C. Less Stringent Emissions Standards in the Low-Emission-Vehicle and Zero Emission Vehicle Regulations

1. Description of the Alternative

This alternative is referred to as the Less Stringent Alternative. It would amend the existing LEV regulation to include less stringent emission standards for light- and medium-duty vehicles for both CAPs and GHGs. More specifically, the standards under this alternative would be less stringent for each model year than those in the proposed ACC Program. This alternative would also amend the ZEV regulation to require manufacturers to earn fewer ZEV credits than would be required under the proposed amendments to the ACC Program. Under this alternative the set of emission standards and ZEV credit requirements that would be phased in for model years 2015 – 2025 would also be less stringent than the proposed ACC Program.

Some attributes of this alternative would be similar to the proposed project, including the replacement of separate standards for NMOG and NO_x with a combined standard that that is based on the sum of these two pollutants. A more robust Federal Test Procedure for measuring emissions would also be required and the "durability basis" would be extended to 150,000 miles to ensure the effectiveness of a vehicle's emissions control systems over the operational life of the vehicle. Also, the SFTP would be extended to medium-duty vehicles the SFTP (known as SFTP II) and would include standards for exhaust emissions of particulate matter. Evaporative emission standards would be extended to more vehicle types and vehicles fueled by gasoline that contains higher percentages of ethanol or other biofuels. Amendments to the CFO regulation would be the same as under the proposed ACC Program.

2. Consistency with Project Objectives

Emissions generated by the statewide fleet of light- and medium-duty vehicles would decrease because the LEV standards under this alternative would be more stringent than the existing LEV regulation standards and the ZEV requirements would be increased from the current ZEV regulation. However, the emissions reduction achieved under this alternative would not be as great as the reductions that would be achieved under the proposed ACC Program. Also, the emissions reduction would not be the maximum feasible reduction that is mandated by HSC Section 43018(a). Thus, this alternative would limit the ability of various air districts throughout the State to attain the State and national ambient air quality standards in their respective air basins.

Similarly, the statewide fleet of light- and medium-duty vehicles would become more GHG-efficient, which would help the State attain its GHG reduction goals; however, the extent of the reduction would be less than the 3.8 MMT CO_2e by 2020 that is identified by ARB as the reduction needed from a ACC Program as identified in ARB's adopted Scoping Plan (ARB 2011b). Thus, this could prevent California from achieving the GHG reduction goal of AB 32, particularly if ARB cannot develop other programs or regulations to reduce GHG emissions. In addition, this alternative would not meet the maximum feasible emission reductions in furtherance of AB 1493.

In addition, the statewide fleet of light- and medium-duty vehicles would become more fuel efficient and, thus, help the State become less dependent on petroleum as an energy source, but not to the extent that it would under the proposed ACC Program.

This alternative would achieve the objective to establish a set of vehicle emissions standards in California and would ensure that some emission reductions would occur.

As described above, the proposed ACC Program includes new future year GHG emission standards that reduce emissions as cleaner vehicles penetrate into the fleet. Because the standards are a fleet mix by calendar year, fleets have the option to comply with them in different way, and the penetration of ZEV vehicles is one of many

ways in which the standards could be met. As a result, ARB staff modeled GHG benefits of the combined program and did not evaluate the tailpipe emission benefits of ZEV apart from the other components of the proposed ACC Program.

As part of this analysis, ARB staff evaluated a less aggressive option, which is consistent with this alternative. Under this less aggressive scenario, emissions would not be reduced by 3 percent per year between 2016 and 2025. Using the proposed phase-in schedule for the regulation, ARB staff estimated the percent reduction in CO_2 emission rates by model year for those vehicles subject to the proposed ACC Program. Table 2-34 of Appendix T shows the Less Stringent Alternative GHG standard for new vehicles in California.

3. Environmental Impacts

The types of impacts under the Less Stringent Alternative would be the same as the proposed amendments to the ACC Program, including potentially significant adverse impacts related to aesthetics, biological resources, cultural resources, geology and soils, hazards and hazardous materials, noise, transportation/traffic, and utilities and service systems. However, because many of the adverse environmental affects would be associated with the development of new or modified manufacturing plants and/or new hydrogen fueling stations, the degree of these impacts from these compliance responses under the Less Stringent Alternative may be less, or occur later in time, than under the proposed ACC Program. This is largely because the Less Stringent Alternative would result in slower penetration of ZEVs and ZEV credit-qualifying vehicles into the statewide vehicle fleet and associated production by manufacturers. Nonetheless, this could result in the construction of new manufacturing plants, or modifications or expansions to existing plants, and the same associated impacts identified for the proposed ACC Program in Chapter 5, Impact Analysis and Mitigation. The penetration of hydrogen FCVs in the vehicle fleet would trigger requirements for major refiners and importers of gasoline to build hydrogen fueling stations (i.e., a trigger of 10,000 vehicles within an air basin and 20,000 vehicles statewide). Moreover, the types of environmental impacts associated with the production, distribution, and sale of hydrogen would be the same as for the proposed project with the exception that less hydrogen production and distribution activity would occur and fewer hydrogen fuel outlets would be constructed. Assuming the trigger level for building required hydrogen fueling stations would occur later in time, the impact associated with construction and operation of these stations may be experienced later as well.

Beneficial air quality, GHG, and energy effects would be anticipated to be less than those that would occur with implementation of the proposed ACC program.

D. A Clean Fuels Outlet Regulation Based on a Memorandum of Agreement with Major Refiners and Importers of Gasoline

1. Description of the Alternative

This alternative is referred to as the Memorandum of Agreement (MOA) Alternative. Under the alternative, the obligations of the CFO regulation would be based on an MOA between ARB, major refiners and importers of gasoline, gasoline station owners, hydrogen fuel providers, vehicle manufacturers, and other government entities rather than a codified regulation. The MOA would describe a multilateral agreement among these parties that outlines the criteria that determine the timing and responsibility of constructing new hydrogen fueling stations at various locations in California. Vehicle manufacturers would commit to providing sales forecasts about the number and locations of hydrogen FCVs they anticipate selling or leasing in the State. The MOA would have the binding power of a contract and be legally enforceable.

All other changes to the LEV and ZEV regulations and the EPL would be the same as the proposed ACC Program.

2. Consistency with Project Objectives

Under the MOA Alternative, it is assumed that the requirements for major refiners and importers of gasoline to establish new hydrogen fueling stations outlined in the MOA would be set by agreement, but not more strictly bound by regulation, increasing the potential for varying levels of commitment. This is typically true of MOAs for multiple reasons including that each party to the agreement may interject its own unique stipulations. It is not clear whether a party to the MOA would face penalties if it failed to fulfill the MOA. This could ultimately result in fewer hydrogen fueling stations being constructed in California under an agreement than if the CFO requirements were codified in regulation. Thus, there may not be a sufficient availability of hydrogen fuel for hydrogen fuel vehicles produced and sold by automobile manufacturers to fulfill the requirements of the ZEV regulation. This could ultimately affect California's ability to achieve the maximum emissions reduction possible from motor vehicles as required by HSC Section 43018(a) and to help local air basins attain the California and national ambient air quality standards. It could also hinder California's ability to achieve a reduction of 3.8 MMT CO_2e by 2020 that ARB identified as the reduction needed from an ACC Program to support the adopted Scoping Plan and achieve AB 32 goals (ARB 2011b), and to further AB 1493 reductions. It is too speculative to determine whether ARB would be able to develop and implement other programs or regulations that would achieve this reduction in time Limited availability of hydrogen fuels stations would also adversely affect the objective of reducing California's dependence on petroleum because a sufficient number and variety of fuel options would not be available to consumers.

3. Environmental Impacts

The types of impacts under the MOA Alternative would be the same as the proposed amendments to the ACC Program, including potentially significant adverse impacts related to aesthetics, biological resources, cultural resources, geology and soils, hazards and hazardous materials, noise, transportation/traffic, and utilities and service systems. However, because many of the adverse environmental affects would be associated with the development of new or modified manufacturing plants and/or new hydrogen fueling stations, the degree of these impacts from these compliance responses under the MOA Alternative may be similar to or less than the proposed ACC Program, depending on the degree of commitment to the agreement. Nonetheless, this could result in the construction of new manufacturing plants, or modifications or expansions to existing plants, and the same associated impacts identified for the proposed ACC Program in Chapter 5, Impact Analysis and Mitigation. The penetration of hydrogen FCVs in the vehicle fleet would then trigger requirements for major refiners and importers of gasoline to build hydrogen fueling stations (i.e., a trigger of 10,000 vehicles within an air basin and 20,000 vehicles statewide). Moreover, the types of environmental impacts associated with the production, distribution, and sale of hydrogen would be the same as for the proposed project with the exception that less hydrogen production and distribution activity would occur and fewer hydrogen fuel outlets would be constructed. Assuming the trigger level for building required hydrogen fueling stations would occur later in time, the impact associated with construction and operation of these stations may be experienced later as well.

Beneficial air quality, GHG, and energy effects would be anticipated to be similar to those that would occur with implementation of the proposed ACC program.

E. Alternatives Considered but Rejected as Infeasible

1. Feebate Regulation

A feebate regulation is a new car pricing scheme where consumers who purchase high-emitting vehicles would pay an extra fee that would be used to fund rebates to consumers who purchase low-emitting vehicles. ARB has sponsored research on the potential benefits of a feebate regulation for new vehicles and eliminated it as an option for a number of reasons (ITS 2011). First, given the aggressive performance standards proposed for new vehicles, the additional emission reductions achieved from increased sales of low-emitting vehicles that could result from a feebate regulation would likely be minimal, because the sale of low-emitting vehicles would be partially offset by the sale of high-emitting vehicles. Manufacturers already need to install all available, cost-effective emission-reducing technology, as well as adopt their own internal pricing strategies to comply with the existing LEV standards. A feebate regulation would replace this internal pricing strategy and would only induce substantial, additional emissions reductions if fees and rebates were very high, leading to greater economic impacts on consumers.

In terms of implementation, maintaining a revenue-neutral regulation would likely be a significant challenge given that vehicle purchase behavior would vary based on current economic conditions, but fee and rebate levels would need to be set in advance. More importantly, ARB may not have the legal authority to pursue feebates and could face challenges similar to pursuing a carbon fee or tax. In addition to legal opposition, there may be public opposition because some consumers would have to pay more for new vehicles. The administration of a feebate regulation would require ARB to collect revenues and then disperse funds. ARB may need additional authority from the Legislature to both disperse funds and collect feebate revenues. Consequently, in light of the legal and administrative challenges for minimal emissions reductions, ARB did not pursue the further evaluation of this alternative.

2. Targeting High-Emitting Vehicles in the Existing Fleet

ARB considered a regulation that would specifically target high-emitting vehicles in the existing vehicle fleet and would require that they install add-on emission controls to control CAPs. However, this type of regulation would not be cost-effective and would be difficult to enforce. In addition, there is a range of technological difficulties associated with after-market equipment and aftermarket technologies generally are not as cost effective at reducing emissions as emission control systems integrated in a vehicle design without compromising driving performance, ease of use, and/or safety. This approach would not fulfill the requirement of HSC, Section 43018(a), which requires ARB to reduce vehicle emissions of CAPs to the maximally extent feasible.

3. Battery Electric Vehicles or Hydrogen Fuel Cell Vehicles Only

ARB considered requiring all light- and medium-duty vehicles to be BEVs or hydrogen FCVs. Market studies by manufacturers have shown that the market for BEVs and hydrogen FCVs is limited to approximately 30 percent of the light- and medium-duty vehicle fleet.

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8.0 MANDATORY FINDINGS OF SIGNIFICANCE

Consistent with the requirements of CEQA Guidelines, CCR, Title 14, Section 15065 and Appendix G, Environmental Checklist, Section 18, this EA addresses the mandatory findings of significance for a project.

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 CCR, Title 14, Section 15065(a) of the CEQA Guidelines, 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 effect on the environment, which is defined in CCR, Title 14, Section 15382 of the CEQA Guidelines 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 of the environmental effects and issue areas, the precise nature and magnitude of impacts would depend on the types of projects associated with implementation of the proposed ACC Program, their locations, their aerial extent, and a variety of site-specific factors that are not known at this time but that would be addressed by environmental reviews at the project-specific level. All of these issues would be addressed through project-specific environmental reviews that would be conducted by local land use agencies or other regulatory bodies at such time the projects are proposed for implementation. ARB would not be the agency responsible for conducting the project-specific environmental review because it is not the agency with authority for making land use decisions.

This EA, in its entirety, addresses and discloses potential environmental effects associated with construction and operation of the proposed ACC Program, including direct, indirect, and cumulative impacts in the following resource areas:

- Aesthetics
- Agriculture and Forestry Resources
- Air Quality
- Greenhouse Gas Emissions

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

As described in Chapter 5, this EA discloses potential environmental impacts, the level of significance prior to mitigation, mitigation measures, and the level of significance after the incorporation of mitigation measures.

a. Impacts on Species

Under CCR, Title 14, Section 15065(a)(1) of the CEQA Guidelines, a lead agency shall find that a project may have a significant effect 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 5, “Biological Resources,” of this EA addresses impacts related to the reduction of the 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

CCR, Title 14, Section 15065(a)(1) of the CEQA Guidelines states that a lead agency shall find that a project may have a significant effect 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. CCR, Title 14, 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 requiring a finding of significance for substantial adverse changes to historical resources. CCR, Title 14, Section 15064.5 of the CEQA Guidelines establishes standards for determining the significance of impacts to historical resources and archaeological sites that are a historical resource. Chapter 5, "Cultural Resources," of this EA addresses impacts related to California history and prehistory, historic resources, archaeological resources, and paleontological resources.

In addition, as with all of the environmental effects and issue areas, the precise nature and magnitude of impacts would depend on the types of projects authorized, their locations, their aerial extent, and a variety of site-specific factors that are not known at this time but that would be addressed by environmental reviews at the project-specific level.

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

As required by CCR, Title 14, Section 15065 of the CEQA Guidelines, a lead agency shall find that a project may have a significant effect on the environment where there is substantial evidence that the project has potential environmental effects that are individually limited, but cumulatively considerable. As defined in CCR, Title 14, Section 15065(a)(3) of the CEQA Guidelines, 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 6, "Cumulative and Growth-Inducing Impacts," of this EA.

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

Consistent with CCR, Title 14, Section 15065(a)(4) of the CEQA Guidelines, a lead agency shall find that a project may have a significant effect on the environment where there is substantial evidence that the project has the potential to cause substantial adverse effects 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 significant affected. This factor relates to adverse changes to the environment of human beings generally, and not to effects on particular individuals. While changes to the environment that could indirectly affect human beings would be represented by all of the designated CEQA issue areas, those that could directly affect human beings include air quality, 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 5 of this EA.

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10.0 LIST OF FIGURES

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11.0 LIST OF TABLES

12.0 ACRONYMS AND ABBREVIATIONS

AADT	average annual daily traffic
AB	Assembly Bill
AC	air conditioning
ACC	Advanced Clean Cars
ACEC	Area of Critical Environmental Concern
ACHP	Advisory Council on Historic Preservation
AFV	alternatively fueled vehicle
AICUZ	Department of Defense Air Installations Compatible Use Zones
ALUC	Airport Land Use Commission
APS	Alternative Planning Strategy
ARB or Board	California Air Recourses Board
AST	Above Ground Tanks
BC	black carbon
BEV	battery electric vehicle
BMPs	best management practices
CAA	Clean Air Act
CAFE	Corporate Average Fuel Economy
CAL FIRE	California, Department of Forestry and Fire Protection
CAL Recycle	California Department of Resources Recycling and Recovery
CalARP	California Accidental Release Prevention
CalEPA	California Environmental Protection Agency
Caltrans	California Department of Transportation
CAP	criteria air pollutant and precursor

CBSC	California Building Standards Code
CCAR	California Climate Action Registry
CCAT	California Climate Action Team
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
Census	U.S. Census Bureau
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFO	Clean Fuels Outlets
CGS	California Geological Survey
CH_4	methane
CHP	California Highway Patrol
CN	California Natural Resources Agency
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CNRA	California Natural Resources Agency
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CPUC	California Public Utilities Code
CUPA	Certified Unified Program Agency
CVP	Central Valley Project
CVTs	continuously variable transmissions

CWA	Clean Water Act
dB	decibel
dBA	A-Weighted Decibel
Delta	Sacramento-San Joaquin Delta
DFG	Department of Fish and Game
DoE	Department of Environment
DOF	State of California, Department of Finance
DOGGR	California Division of Oil, Gas, and Geothermal Resources
DOJ	California Department of Justice
DTSC	California Department of Toxic Substances Control
DWR	California Department of Water Resources
E10	10 percent by volume ethanol
E10 fuel	fuel that contains 10 percent ethanol
EA	Environmental Analysis
EDCs	endocrine disrupting compounds
EDD	California Employment Development Department
EIS	environmental impact statement
EISA	Energy Independence and Security Act
EPCA	Energy Policy and Conservation Act
EPCRA	Emergency Planning and Community Right-to-Know Act
EPL	California Environmental Performance Label
FAA	Federal Aviation Administration
FCVs	fuel cell vehicles
FEMA	Federal Emergency Management Agency

FHA	Federal Highway Administration
FHMR	Federal Hazardous Materials Regulations
FHWA	Federal Highway Administration
FLPMA	Federal Land and Policy Management Act
FRA	Federal Rail Administration
FSOR	Final Statement of Reasons
FTA	Federal Transit Administration
g/mi	grams per mile
gCO_2/mile	grams of CO_2 per mile
GHGs	greenhouse gas
GWP	global warming potential
HAPs	hazardous air pollutants
HC	hydrocarbons
HC	particulate matter, and evaporative emissions of hydrocarbons
HFCs	hydrofluorocarbons
HFCV	hydrogen fuel cell vehicles
HSC	Health and Safety Code
HTAC	Hydrogen and Fuel Cell Technical Advisory Committee of the U.S. Department of Energy
HUD	U.S. Department of Housing and Urban Development
HV	High-Voltage
in/sec	inches per second
IPCC	Intergovernmental Panel on Climate Change
ITS	Institute of Transportation Studies

IVM	intermediate volume manufacturer
kg/day	kilograms per day
kg/yr	kilograms per year
LCFS	Low Carbon Fuel Standard
L_{dn}	Day-Night Noise Level
LDTs	light-duty trucks
LEA	local enforcement agencies
LEPCs	local emergency planning committees
L_{eq}	Equivalent Noise Level
LEV II	LEV regulation
LEV III	Low-Emission Vehicle and Greenhouse Gas Regulation
L_{max}	Maximum Noise Level
L_{min}	Minimum Noise Level
LOS	level of service
LVM	large volume manufacturer
MACT and BACT	maximum or best available control technology for toxics
MDPVs	medium-duty passenger vehicles
MDV	medium-duty vehicles
mg/L	milligrams per liter
MMT	Million Metric Tons
$MMTCO_2e$	million metric tons of carbon dioxide equivalent
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MPOs	Metropolitan Planning Organizations

MRZs	Mineral Resource Zones
MS4 Permit	General Permit for Municipal Separate Storm Sewer Systems Permit
MTBE	methyl tertiary butyl ether
mya	million years ago
N_2O	nitrous oxide
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
NEMA	Association of Electrical and Medical Imaging Equipment Manufacturers
NESHAP	national emissions standards for HAPs
NF_3	nitrogen trifluoride
NHPA	National Historic Preservation Act
NHTSA	National Highway Traffic Safety Administration
NiMH	nickel–metal hydride
NMHC	non-methane hydrocarbon
NMOG	non-methane organic gas
NO_X	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NREL	National Renewable Energy Laboratory
NRHP	National Register of Historic Places
OAQPS	Office of Air Quality Planning and Standards
OEM	original equipment manufacturer
ORVR	onboard refueling vapor recovery
OSHA	U.S. Department of Labor Occupational Safety and Health Administration

PA	Programmatic Agreements
PCBs	polychlorinated biphenyl compounds
PCs	passenger cars
PEM	Proton Exchange Membrane
PFCs	perfluorocarbons
PGM	platinum-group metal
PHEVs	plug-in hybrid electric vehicles
PIER	Public Interest Energy Research
PM	particulate matter
polycarbonate	plastics and carbon composites
ppb	parts per billion
PPV	peak particle velocity
PRC	Public Resources Code
PUC	California Public Utilities Commission
PZEV	Partial Zero Emission Vehicle
RCRA	Resource Conservation and Recovery Act
RFS	Renewable Fuels Standard
RMP	Risk Management Plan
RMS	root-mean-square
RNHA	Regional Housing Needs Allocation
ROG	reactive organic gas
ROWs	right-of-ways
RTP	Regional Transportation Plan
RWQCB	regional water quality control board

SAE	Society of Automotive Engineers
SARA	Superfund Amendments and Reauthorization Act
SBE	State Board of Education
SCR	selective catalytic reduction
SCS	Sustainable Communities Strategy
SDC	Seismic Design Criteria
SDWA	Safe Drinking Water Act
SERCs/TERCs	state/tribe emergency response commissions
SF_6	sulfur hexafluoride
SFTP	California Supplemental Federal Test Procedure
SHPO	State Historic Preservation Officer
SIC	Standard Industrial Classification
SIPs	State Implementation Plans
SMARA	Surface Mining and Reclamation Act
SMR	steam methane reformation
SULEVs	Super-Ultra-Low-Emission Vehicles
SUVs	sport utility vehicles
SWAMP	Surface Water Ambient Monitoring Program
SWP	State Water Project
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	California State Water Resources Control Board
TACs	toxic air contaminants
TDS	Total dissolved solids
TMDL	Total Maximum Daily Load

TPY	tons per year
TSCA	Toxic Substances Control Act
TZEV	Transitional Zero Emission Vehicles
U.S. BR	U.S. Bureau of Reclamation
U.S. EPA	U.S. Environmental Protection Agency
ULEVs	Ultra-Low-Emission Vehicles
UNEP	United Nations Environment Programme
USACE	U.S. Army Corps of Engineers
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
UST	Underground Tanks
V/C	volume-to-capacity ratio
VC	California Vehicle Code
VdB	vibration decibels
VMT	vehicle miles travelled
WDRs	waste discharge requirements
WMO	World Meteorological Organization
WSA	water supply assessment
ZEV	Zero Emission Vehicle

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ATTACHMENT 1. ENVIRONMENTAL CHECKLIST

Refer to Chapter 5.0, Impact Analysis and Mitigation, for a full discussion of the environmental issues.

A. Aesthetics

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact/No Impact	Beneficial Impact
Aesthetics. Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☒	☐	☐	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?	☒	☐	☐	☐
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☒	☐	☐	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☒	☐	☐	☐

B. Agriculture and Forest Resources

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact/No Impact	Beneficial Impact
Agriculture and Forest Resources.				
In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997, as updated) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the State's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.				
Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☒	☐
b) Conflict with existing zoning for agricultural use or a Williamson Act contract?	☐	☐	☒	☐
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220[g]), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104[g])?	☐	☐	☒	☐
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☒	☐
e) Involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☒	☐

C. Air Quality

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact/No Impact	Beneficial Impact
Air Quality.				
Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied on to make the following determinations.				
Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?				
Construction Impacts	☐	☒	☐	☐
Operational Impacts	☐	☐	☐	☒
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?				
Construction Impacts	☐	☒	☐	☐
Operational Impacts	☐	☐	☐	☒
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?				
Construction Impacts	☐	☒	☐	☐
Operational Impacts	☐	☐	☐	☒
d) Expose sensitive receptors to substantial pollutant concentrations?				
Construction Impacts	☐	☒	☐	☐
Operational Impacts	☐	☐	☐	☒
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐

D. Greenhouse Gas Emissions

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact/No Impact	Beneficial Impact
Greenhouse Gas Emissions. Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☐	☒
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☐	☒

E. Biological Resources

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact/No Impact	Beneficial Impact
Biological Resources. Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or the U.S. Fish and Wildlife Service?	☒	☐	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the California Department of Fish and Game or the U.S. Fish and Wildlife Service?	☒	☐	☐	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☒	☐	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☒	☐	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☒	☐	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan?	☒	☐	☐	☐

F. Cultural Resources

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact/No Impact	Beneficial Impact
Cultural Resources. Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	☒	☐	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	☒	☐	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☒	☐	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☒	☐	☐	☐

G. Geology and Soils

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact/No Impact	Beneficial Impact
Geology and Soils. Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to California Geological Survey Special Publication 42.)	☒	☐	☐	☐
ii) Strong seismic ground shaking?	☒	☐	☐	☐
iii) Seismic-related ground failure, including liquefaction?	☒	☐	☐	☐
iv) Landslides?	☒	☐	☐	☐
b) Result in substantial soil erosion or the loss of topsoil?	☒	☐	☐	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☒	☐	☐	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994, as updated), creating substantial risks to life or property?	☒	☐	☐	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☒	☐

H. Hazards and Hazardous Materials

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact/No Impact	Beneficial Impact
Hazards and Hazardous Materials. Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and/or accident conditions involving the release of hazardous materials into the environment?	☒	☐	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☒	☐
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☒	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☒	☐
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☒	☐
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
h) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☒	☐

I. Hydrology and Water Quality

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact/No Impact	Beneficial Impact
Hydrology and Water Quality. Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☒	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial on- or off-site erosion or siltation?	☒	☐	☐	☐
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in on- or off-site flooding?	☒	☐	☐	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☒	☐
f) Otherwise substantially degrade water quality?	☐	☐	☒	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☒	☐	☐	☐
h) Place within a 100-year flood hazard area structures that would impede or redirect flood flows?	☒	☐	☐	☐
i) Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?	☒	☐	☐	☐
j) Result in inundation by seiche, tsunami, or mudflow?	☒	☐	☐	☐

J. Land Use and Planning

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact/No Impact	Beneficial Impact
Land Use and Planning. Would the project:				
a) Physically divide an established community?	☐	☐	☒	☐
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, a general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☒	☐
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☒	☐

K. Mineral Resources

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact/No Impact	Beneficial Impact
Mineral Resources. Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State?	☐	☐	☒	☐
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☒	☐

L. Noise

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact/No Impact	Beneficial Impact
Noise. Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or in other applicable local, State, or federal standards?	☒	☐	☐	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☒	☐	☐	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☒	☐
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☒	☐

M. Population and Housing

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact/No Impact	Beneficial Impact
Population and Housing. Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☒	☐
b) Displace substantial numbers of existing homes, necessitating the construction of replacement housing elsewhere?	☐	☐	☒	☐
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☒	☐

N. Public Services

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact/No Impact	Beneficial Impact
Public Services. Would the project:				
a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:				
Fire protection?	☐	☐	☒	☐
Police protection?	☐	☐	☒	☐
Schools?	☐	☐	☒	☐
Parks?	☐	☐	☒	☐
Other public facilities?	☐	☐	☒	☐

O. Recreation

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact/No Impact	Beneficial Impact
Recreation. Would the project:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☒	☐
b) Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☒	☐

P. Transportation/Traffic

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact/No Impact	Beneficial Impact
Transportation/Traffic. Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?				
Construction Impacts	☒	☐	☐	☐
Operational Impacts	☐	☐	☒	☐
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?				
Construction Impacts	☒	☐	☐	☐
Operational Impacts	☐	☐	☒	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?				
Construction Impacts	☒	☐	☐	☐
Operational Impacts	☐	☐	☒	☐
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				
Construction Impacts	☒	☐	☐	☐
Operational Impacts	☐	☐	☒	☐
e) Result in inadequate emergency access?				
Construction Impacts	☒	☐	☐	☐
Operational Impacts	☐	☐	☒	☐
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?				
Construction Impacts	☒	☐	☐	☐
Operational Impacts	☐	☐	☒	☐

Q. Utilities and Service Systems

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact/No Impact	Beneficial Impact
Utilities and Service Systems. Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☒	☐	☐	☐
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☒	☐	☐	☐
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☒	☐	☐	☐
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☒	☐	☐	☐
e) Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand, in addition to the provider's existing commitments?	☒	☐	☐	☐
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☒	☐	☐	☐
g) Comply with federal, State, and local statutes and regulations related to solid waste?	☒	☐	☐	☐

R. Mandatory Findings of Significance

ENVIRONMENTAL ISSUES	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact/No Impact	Beneficial Impact
Mandatory Findings of Significance.				
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of 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 an endangered, rare, or threatened species, or eliminate important examples of the major periods of California history or prehistory?	☒	☐	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	☒	☐	☐	☐
c) Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?	☒	☐	☐	☐

Authority: Public Resources Code Sections 21083, 21083.5.
Reference: Government Code Sections 65088.4.
Public Resources Code Sections 21080, 21083.5, 21095; *Eureka Citizens for Responsible Govt. v. City of Eureka* (2007) 147 Cal.App.4th 357; *Protect the Historic Amador Waterways v. Amador Water Agency* (2004) 116 Cal.App.4th at 1109; *San Franciscans Upholding the Downtown Plan v. City and County of San Francisco* (2002) 102 Cal.App.4th 656.