Appendix D

Draft Environmental Analysis

For the Proposed

In-Use Locomotive Regulation

California Air Resources Board
1001 I Street
Sacramento, CA 95814

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Figures

List of Abbreviations

AB	Assembly bill
APE	area of potential effects
ATCM	Airborne Toxic Control Measure
BAU	business-as-usual
BLM	U.S. Bureau of Land Management
BMP	best management practice
BNSF	BNSF Railway
CAA	Clean Air Act
CAAQS	California ambient air quality standards
CalEnviroScreen	California Communities Environmental Health Screening Tool
CAL FIRE	California Department of Forestry and Fire Protection
CARB or Board	California Air Resources Board
CCAA	California Clean Air Act
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CPUC	California Public Utilities Commission
dBA	A-weighted decibels
diesel PM	diesel particulate matter
Draft EA	draft environmental analysis
EO	executive order
FTA	Federal Transit Administration
GHG	greenhouse gas
HVL	high-voltage load
in/sec	inches per second
ISOR	Initial Statement of Reasons
LCFS	Low Carbon Fuel Standard
L_{eq}	equivalent level measurements

L_{max}	maximum sound level
MT	metric tons
$MTCO_2e$/year	metric tons of carbon dioxide equivalent per year
MWh	megawatt hours
NAAQS	national ambient air quality standards
NO_X	oxides of nitrogen
ORE	Operational Requirements Exception
PGM	platinum-group metals
PM	particulate matter
PM_{10}	respirable particulate matter
$PM_{2.5}$	fine particulate matter
PPV	peak particle velocity
PRC	Public Resources Code
Program	Community Air Protection Program
RPS	Renewables Portfolio Standard
SB	Senate bill
SCR	Selective Catalytic Reduction
TAC	toxic air contaminant
TPY	tons per year
U.S. DOE	U.S. Department of Energy
U.S. EPA	U.S. Environmental Protection Agency
UP	Union Pacific Railroad
VdB	vibration decibels
VOC	volatile organic compound
WTT	well-to-tank
ZE	zero-emission

I. Introduction and Background

A. Introduction

This draft environmental analysis (Draft EA) is a program environmental document prepared to cover the Proposed In-Use Locomotive Regulation (Proposed Regulation or Proposed Project). It is included as Appendix D of the California Air Resources Board (CARB or Board) Initial Statement of Reasons (ISOR or Staff Report) that will be presented to the Board for consideration. The "Project Description" section of this Draft EA presents a summary of the Proposed Regulation, as defined under the California Environmental Quality Act (CEQA). A detailed description of the Proposed Regulation is included in *Staff Report: Proposed In-Use Locomotive Regulation* (date of release: September 20, 2022), which is hereby incorporated by reference.

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

B. 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. An EA for broad programs cannot be as detailed as it can be for specific projects (Title 14 California Code of Regulations (CCR) § 15146). For example, the assessment of a construction project would be naturally more detailed than one concerning the adoption of a local general plan because construction-related effects can be predicted with more accuracy (Title 14 CCR § 15146(a)). Because this analysis addresses a broad regulatory program, a general level of detail is appropriate. However, this Draft EA makes a rigorous effort to evaluate significant adverse impacts and beneficial impacts of the reasonably foreseeable compliance responses that could result from implementation of the Proposed Regulation, and it contains as much information about those impacts as is currently available, without being unduly speculative.

The scope of analysis in this Draft EA is intended to help focus public review and comments on the Proposed Regulation and ultimately to inform the Board of the environmental benefits and adverse impacts of the Proposed Regulation. This analysis specifically focuses on potentially significant adverse and beneficial impacts on the physical environment resulting from reasonably foreseeable compliance responses related to implementation of the Proposed Regulation.

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

1. The analysis addresses the potentially significant adverse environmental impacts resulting from implementation of the Proposed Regulation compared to existing conditions.

2. The analysis of environmental impacts and determinations of significance are based on reasonably foreseeable compliance responses taken in response to implementation of the Proposed Regulation.

3. The analysis addresses environmental impacts within and outside California to the extent they are reasonably foreseeable and do not require speculation.

4. The level of detail of impact analysis is necessarily and appropriately general because the Proposed Regulation is programmatic. While the general locations of railyards and rail lines in California are known, decisions by the regulated entities regarding compliance options and the precise location of the many components covered in the Proposed Regulation are unknown. Furthermore, predicting decisions by entities regarding the specific location and design of infrastructure made in response to implementation of the Proposed Regulation would be speculative (if not impossible) at this early stage, given the influence of other business and market considerations in those decisions. As a result, there is inherent uncertainty regarding the degree of mitigation that would ultimately need to be implemented to reduce any potentially significant impacts identified in this Draft EA. Consequently, this Draft EA takes the conservative approach in its post mitigation significance conclusions (i.e., tending to overstate the potential that feasible mitigation may not be implemented by the agency with authority to do so or may not be sufficient) and discloses, for CEQA compliance purposes, that potentially significant environmental impacts may be unavoidable, where appropriate. It is also possible that the amount of mitigation necessary to reduce environmental impacts to a less-than-significant level may be less than disclosed in this Draft EA on a case-by-case basis. Specific actions undertaken to implement the Proposed Regulation would undergo project-level environmental review and compliance processes as required at the time they are proposed. It is expected that many individual development projects would be able to feasibly avoid potentially significant impacts or mitigate them to a less-than-significant level.

5. This Draft EA generally does not analyze site-specific impacts when determinations regarding changes in the location of future facilities or other infrastructure would be

speculative. However, this Draft EA does examine regional (e.g., local air district and/or air basin) and local issues to the degree feasible where appropriate. As a result, the impact conclusions in the resource-oriented sections of Chapter 4, "Impact Analysis and Mitigation Measures," cover broad types of impacts, considering the potential effects of the full range of reasonably foreseeable actions undertaken in response to the Proposed Regulation.

C. Background Information on Locomotives

Locomotives emit harmful pollutants (e.g., toxic air contaminants) while in transit and during stationary operation at ports, railyards, industrial properties, and other locations that are often close to sensitive receptors, such as schools, hospitals, elder care facilities, and residential neighborhoods.

Under the Clean Air Act, the U.S. Environmental Protection Agency (U.S. EPA) has established emissions standards for new locomotives. The first set of locomotive emission regulations was approved in 1998, specifying control levels for pollutants in engine Tiers 0-2. In 2008, U.S. EPA approved the second set of locomotive emission regulations, introducing "plus" designations for emission control levels that Tier 0, 1, and 2 locomotives in the remanufacturing process must meet (incrementing from Tier 0, 1, 2 to Tier 0+, 1+, and 2+, respectively). U.S. EPA also proposed Tier 3 and 4 standards for newly manufactured locomotives in 2008.[1]

U.S. EPA requires manufacturers to ensure that freshly manufactured locomotives meet specified emissions standards (currently Tier 4) during a specified "useful life" period, beginning at the point of manufacturer and lasting for at least approximately 10 years. At any point before a locomotive is retired or sold for scrap, the owner of that locomotive may choose to remanufacture it. Part of the remanufacturing process entails ensuring the locomotive can achieve the designated remanufacture emission standard (Tier 0+, 1+, 2+, 3, or 4, as described above). Therefore, U.S. EPA again requires that remanufacturers ensure that the remanufactured locomotive meet the specified remanufacturer emission standards for another "useful life" period. A remanufacture does not reduce emissions to the cleanest, most current standard, but rather may make a smaller, more incremental improvement (depending on the original Tier of the locomotive). The locomotive remanufacture process can be repeated with no limit, but does not result in any additional incremental improvement beyond what might be achieved the first time. For example, if a very old Tier 1 locomotive is remanufactured, it will be remanufactured to a Tier 1+ standard (slightly better than the original Tier 1). It may be remanufactured several times after that, but always to that same Tier 1+ standard. Thus, older locomotives continue to pollute at a far greater rate—per unit of work—than newer locomotives, regardless of remanufacture status.

[1] U.S. EPA, Technical Highlights, Emissions Factors for Locomotives EPA-420-F-09-025. (weblink: https://nepis.epa.gov/Exe/ZyPDF.cgi/P100500B.PDF?Dockey=P100500B.PDF).

In the past, CARB has entered into voluntary agreements with Union Pacific Railroad (UP) and BNSF Railway Company (BNSF) intended to reduce emissions from locomotives operating in California. The first agreement, the 1998 Locomotive NO_X Fleet Average Emissions Agreement in the South Coast Air Basin[2] mandated a Tier 2-average oxides of nitrogen (NO_X) emission standard throughout the South Coast Air Basin by 2010. In 2005, CARB, BNSF and UP entered into a second agreement, entitled, ARB/Railroad Statewide Agreement, Particulate Emissions Reduction Program at California Rail Yards[3], which initiated early use of low-sulfur diesel in locomotives, established a statewide idle-reduction program, and ensured that UP and BNSF would work with CARB to obtain Health Risk Assessments at 18 of California's major railyards.

While voluntary agreements and federal locomotive standards have achieved some emission reductions, more reductions are needed to address the air quality, public health, and climate change concerns associated with locomotive operations. The Proposed Regulation would be California's first regulation of locomotives in use.

1. Trains and Locomotives

A train is made up of locomotives and railcars. A locomotive is the self-propelled on-track equipment used to push or pull a train. Railcars can be used to transport freight or passengers. Railcars must be coupled with a locomotive to move unless the railcar is self-propelled, which is often the case in passenger trains. A typical freight or passenger train in the United States is powered by a locomotive diesel engine that drives an electric generator or alternator. The generator provides electricity to the traction motors, which in turn drive the locomotive wheels.

There are three different types of locomotives, and each produces a different emission profile. Below is a description of each of the locomotive types.

2. Line Haul Locomotives

Line haul locomotives are powered by an engine with a maximum rated power (or a combination of engines having a total rated power) greater than 2,300 horsepower.[4] Line haul locomotives may travel throughout the North American rail system (e.g., Chicago to Los Angeles).

Figure 1: Line Haul Locomotive

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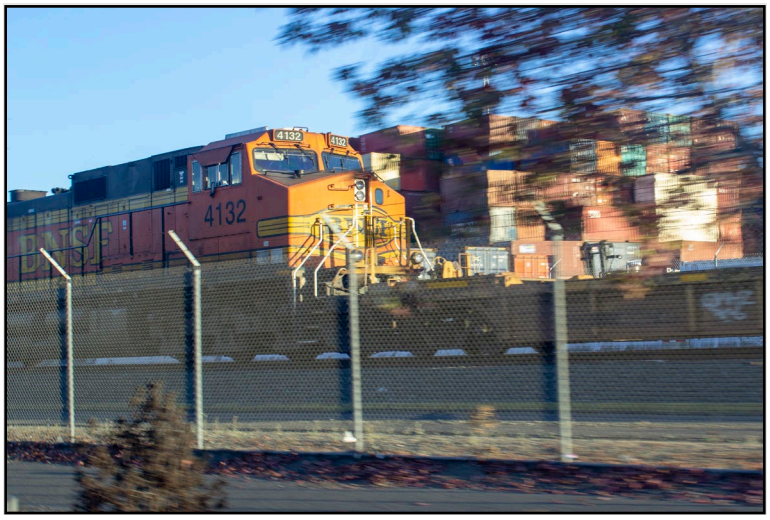
[2] CARB, Memorandum of Mutual Understandings and Agreements, South Coast Locomotive Fleet Average Emissions Program, July 2, 1998. (weblink: https://ww2.arb.ca.gov/sites/default/files/2018-06/loco_flt.pdf)

[3] CARB, 2005 Statewide Railyard Agreement, 2005. (weblink: (https://ww2.arb.ca.gov/resources/documents/2005-statewide-railyard-agreement).

[4] U.S. EPA, Locomotives: Exhaust Emission Standards; March 2016. (weblink: https://nepis.epa.gov/Exe/ZyPDF.cgi/P100OA09.PDF?Dockey=P100OA09.PDF).



3. Switch Locomotives

Switch locomotives, or "switchers," are locomotives powered by an engine with a maximum rated power (or a combination of engines having a total rated power) of 2,300 horsepower or less.[5] Switch locomotives are used within a localized area, generally moving cars throughout a railyard or industrial facility. Often, switch locomotives are older locomotives that have been transitioned from line haul service.

[5] U.S. EPA, Locomotives: Exhaust Emission Standards, March 2016. (weblink: *https://nepis.epa.gov/Exe/ZyPDF.cgi/P100OA09.PDF?Dockey=P100OA09.PDF*).

Figure 2: Switch Locomotive

4. Passenger Locomotives

Passenger locomotives are highly specialized to pull passenger railcars. They may travel over long (cross-country) or short (intrastate or local commuter) distances. One major difference between passenger locomotives and freight locomotives is that passenger locomotives generally have a main propulsion engine and onboard hotel power (a diesel generator), sometimes referred to as head-end power. This diesel generator provides electricity via cable for the lights, air conditioning, and other material comforts to connected passenger cars.

Figure 3: Passenger Locomotive

5. Locomotive Operator Classes and Types

The Surface Transportation Board classifies railroads (locomotive operators) by operating revenues and provides periodic updates to the revenue thresholds.[6] Currently, railroads are grouped into the following three classes:

- Class I carriers have annual carrier operating revenues of $943 million or more.
- Class II carriers have annual carrier operating revenues of less than $943 million but in excess of $42.4 million.
- Class III carriers have annual carrier operating revenues of $42.4 million or less.

a) Class I Freight Railroads

In 2020, two Class I locomotive operators, or major railroads (UP and BNSF), operated about 11,000 freight interstate line haul locomotives within California annually. Class I line haul locomotives represent about 90 percent of all statewide locomotive activity and emissions. In addition, UP and BNSF operate about 400–500 intrastate locomotives, including switchers, that add approximately 4 percent of statewide locomotive activity and emissions.

b) Class II and Class III Freight Railroads

In 2020, one Class II railroad and about 28 Class III (sometimes called "short line") railroads operated within the state. These freight rail operations typically feed small numbers of UP and BNSF railcars to be distributed across the North American freight rail network. In 2020, it was estimated that California's short line railroads operated about 200 switcher and smaller line haul locomotives statewide and generated approximately 2 percent of statewide locomotive diesel fuel consumption and emissions.

c) Industrial Operators

Industrial locomotive operators typically use smaller, older switchers and other lower-horsepower locomotives within the boundaries of a granary, plant, or facility. In 2020, it was estimated that industrial operators maintained about 72 older, smaller-horsepower switch locomotives statewide and generated less than 1 percent of statewide locomotive diesel fuel consumption and emissions.

d) Passenger Locomotive Operators

Passenger locomotive operators in California include intercity carriers such as Amtrak (California Zephyr, Coast Starlight, Southwest Chief, and Sunset Limited) and Amtrak California (Capitol Corridor, Pacific Surfliner, and San Joaquin), as well as commuter rail, such

[6] Surface Transportation Board, Economic Data, accessed August 7, 2022. (weblink: *https://prod.stb.gov/reports-data/economic-data/*).

as Metrolink, Caltrain, and the North County Transit District. Passenger locomotive operators operate about 130 locomotives in California, and these locomotives typically are powered by 3,000- to 4,000-horsepower engines. California's passenger operators have replaced approximately 50 percent of their fleets with Tier 4 locomotives since 2015. In 2020, it was estimated that California's passenger operators consumed approximately 4 percent of statewide locomotive diesel fuel and generated the same percentage of statewide emissions.

For more information about California's locomotive populations in the state and their emissions, see Table 1, below.

Table 1: 2020 Locomotive Populations and Emissions by Railroad Type[7]

Type	Population	Number Operating in California per Day	NO_X (tpy)	$PM_{2.5}$ (tpy)	CO_2 ($MTCO_2e$/ year)
Class I Freight Line Haul	15,202*	700	25,518	581	2,413,000
Class I Freight Switcher	596	596	1,560	31	105,000
Class II and III	159	159	633	10	42,700
Passenger	129	129	1,662	28	205,000
Industrial Switcher	66	66	222	5	9,300

Notes: CO_2 = carbon dioxide; $MTCO_2e$/year = metric tons of carbon dioxide equivalent per year; NO_X = oxides of nitrogen; $PM_{2.5}$ = particulate matter with an aerodynamic diameter of 2.5 microns or less.

* Estimated total national fleets of Union Pacific and BNSF, line haul and switch combined.[8] For full inventory data, see Appendix G.

D. Environmental Review Process: Requirements under CARB's Certified Regulatory Program

CARB is the lead agency for the Proposed Regulation and has prepared this Draft EA pursuant to its regulatory program certified by the Secretary of the Natural Resources Agency (Title 14 CCR Section 15251(d); Title 17 CCR Sections 60000-60008). In accordance with Public Resources Code Section 21080.5 of CEQA, public agencies with certified regulatory programs are exempt from certain CEQA requirements, including but not limited

[7] Appendix G: CARB's 2022 In-Use Locomotive Emission Inventory: Regulation Proposal and Scenarios
[8] Surface Transportation Board (stb.gov) R-1 annual reports covering 11 years (UP and BNSF report separately), (weblink: https://www.stb.gov/reports-data/economic-data/annual-report-financial-data/).

to preparing environmental impact reports, negative declarations, and initial studies (Title 14 CCR Section 15250). CARB has prepared this Draft EA to assess the potential for significant adverse and beneficial environmental impacts associated with the Proposed Regulation, as required by CARB's certified regulatory program (Title 17 CCR Section 60005[b]). The resource areas from the CEQA Guidelines Environmental Checklist were used as a framework for assessing the potential for significant impacts (Title 17 CCR Section 60005[b]).

If comments received during the public review period raise significant environmental issues, staff will summarize and respond to the comments in the Final Statement of Reasons prepared for the Proposed Regulation. The written responses to environmental comments will be approved prior to final action on the Proposed Regulation (Title 17 CCR Section 60007[a]). If the Proposed Regulation is adopted, a notice of decision will be posted on CARB's website and filed with the Secretary of the Natural Resources Agency for public inspection (Title 17 CCR Section 60007[b]).

E. Public Review Process for the Environmental Analysis

On October 27, 2020, CARB issued a notice of preparation for the Proposed Regulation, announcing that it would prepare an EA. At public workshops held on October 29, 2020, and October 30, 2020, staff discussed proposed regulatory concepts for the Proposed Regulation. Staff also described plans to prepare a Draft EA for the Proposed Regulation and invited public feedback on the scope of environmental analysis.

In accordance with CARB's certified regulatory program, and consistent with CARB's commitment to public review and input on regulatory actions, this Draft EA is subject to a public review process. The Staff Report, which includes this Draft EA, is posted for a public review period that begins on September 23, 2022 and ends on November 7, 2022. This period complies with requirements for a minimum of 45 days of public review (Title 17 CCR, Section 60004.2[b][2]).

At the conclusion of the public review period, the Board will hold public hearings on the Proposed Regulation. At the first hearing, currently scheduled for November 17, 2022, the Board will not take any approval action on the proposal; however, the Board may provide direction to staff on modifications to make to the Proposed Regulation. Staff would address any proposed changes in a notice that would be issued with modified regulatory language and supporting documentation for one or more 15-day review and comment periods as required under the Administrative Procedure Act.

At the conclusion of all review periods, staff will compile public comments and responses, including comments on this Draft EA made during the noticed 45-day comment period (or during any further comment period if CARB determines recirculation of this Draft EA is necessary), and prepare a final hearing package, which includes the Final EA and response to environmental comments, for the Proposed Regulation for the Board's consideration at a second public hearing. This second hearing is currently planned for spring 2023. If the final Regulation is adopted by the Board at that time, a notice of decision will be posted on

CARB's regulatory webpage and will be filed with the Secretary of the Natural Resources Agency. The Final Statement of Reasons for the final Regulation would be prepared by staff, and the completed regulatory package would be filed with the Office of Administrative Law.

II. Project Description

A. Objectives

Recognizing the need to attain the national ambient air quality standards and California ambient air quality standards for criteria air pollutants, reduce exposure to toxic air contaminants (TACs), and reduce greenhouse gas (GHG) emissions, the primary objectives of the Proposed Regulation are the following:

1. Achieve reductions of oxides of nitrogen (NO_X), particulate matter (PM), GHG, diesel particulate matter, and black carbon emissions from locomotives operating in California, to provide public health benefits throughout the state, and especially in communities near locomotive operations that are heavily burdened by freight pollution.

2. Minimize the operation of pre-Tier 4 locomotives in California to provide public health benefits throughout the state.

3. Assist in achieving CARB's proposed strategy to attain health-based federal air quality standards over the next 15 years as part of nonattainment area State Implementation Plans.

4. Reduce the state's dependence on petroleum as an energy resource, and support the use of diversified fuels in the state's transportation fleet (Public Resources Code (PRC) Section 25000.5). In addition, using petroleum as an energy resource contributes substantially to the following public health and environmental problems: air pollution, acid rain, global warming, and the degradation of California's marine environment and fisheries (PRC Section 25000.5[b], [c]).

5. Decrease GHG emissions in support of statewide GHG reduction goals by limiting the use of internal combustion engine-powered locomotives, as identified in CARB's 2017 Climate Change Scoping Plan,[9] developed to reduce GHG emissions in California, as directed by Assembly Bill (AB) 32 (Nuñez, Chapter 488, Statutes of 2006). The Scoping Plan and the 2020 Mobile Source Strategy[10] aim to accelerate development and deployment of the cleanest feasible mobile source technologies and to improve access to clean transportation. Implementation of the Proposed Regulation would also provide further GHG emission reductions pursuant to AB 1493 (Pavley, Chapter 200, Statutes of 2002).

6. Maintain and continue reductions in GHG emissions beyond 2020, in accordance with AB 32 (Health and Safety Code Sections 38551[b], 38562, 38562.5, 38566) and Senate Bill 32

[9] CARB, 2017 Climate Change Scoping Plan, 2017. (weblink: https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/scoping_plan_2017.pdf).
[10] CARB, 2020 Mobile Source Strategy, October 28,2021. (weblink: https://ww3.arb.ca.gov/planning/sip/2016sip/2016mobsrc.pdf).

(Health and Safety Code Sections 38560–38566), and pursue measures that implement reduction strategies covering the state's GHG emissions in furtherance of California's mandate to reduce GHG emissions to the 1990 level by 2020 and 40 percent below the 1990 level by December 31, 2030.

7. Transition California's off-road sector to zero emission (ZE) technology as per requirements of Executive Order N-79-20.[11]

8. Complement existing programs and plans to ensure, to the extent feasible, that activities undertaken pursuant to the measures complement, and do not interfere with, existing planning efforts to reduce GHG emissions, criteria pollutant emissions, toxic air contaminant emissions, and the use of petroleum-based transportation fuels.

9. Achieve emission reductions that are real, permanent, quantifiable, verifiable, and enforceable (Health and Safety Code Sections 38560, 38562[d][1]).

10. Improve ZE technologies for locomotives and fueling infrastructure to guide the acceleration of the development of environmentally superior locomotives that will continue to deliver the performance, practicality, and safety demanded by the market.

11. Further the objectives set forth in AB 617[12] to support a reduction of emissions of TACs and criteria air pollutants in communities affected by a high cumulative exposure burden.

12. Take steps to ensure all Californians can live, work, and play in a healthful environment free from harmful exposure to air pollution. Protect and preserve public health and well-being, and prevent irritation to the senses, interference with visibility, and damage to vegetation and property (Health and Safety Code Section 43000[b]) in recognition that the emission of air pollutants from motor vehicles is the primary cause of air pollution in many parts of the state (Health and Safety Code Section 43000[a]).

B. Description of the Proposed Regulation

The Proposed Regulation has four main components: a spending account, in-use operational requirements, idling limits, and recordkeeping and reporting. It applies to all locomotives operating in the state of California except for (1) locomotives with an engine that has a total rated power of less than 1,006 horsepower; (2) locomotives owned by an accredited college, technical institute, or university that are used for "hands-on experience" certification required for diesel mechanics and locomotive engineers and that cannot be used for any other purposes, such as to haul freight or passengers; (3) equipment designed for operation

[11] Executive Department State of California, Executive Order N-79-20, September 2020. (weblink: https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf).

[12] Assembly Bill No. 617, July 26, 2017, accessed August 7, 2022. (weblink: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB617).

both on roads and on rails; and (4) military locomotives. Historic locomotive fleets that do not exceed 10,000 gallons of fuel use per year may be exempt from the spending account and in-use operational requirement provisions of the Proposed Regulation. More detailed descriptions of the Proposed Regulation's components are included below and in Chapter I of the Staff Report. The full draft Regulation Order can be found in Appendix A of the Staff Report.

1. Spending Account

Starting January 1, 2023, each locomotive operator would begin tracking California locomotive activity either in megawatt-hours (MWh) or, in some cases, by gallons of fuel used in each California air district.[13] Locomotive operators shall register all locomotives operating in California and report the previous year's activity by July 1, 2024. Prior to July 1, 2024, locomotive operators would calculate and deposit funds into a "spending account" held in their name. The deposit amount is determined using the equation provided in the Proposed Regulation Order and each locomotive's emission factors and activity (in MWh) in California the year prior. Emission factors reflect estimates of the health cost burden on Californians due to these locomotive emissions. Annual locomotive reporting would include documentation showing spending account deposits and withdrawals.

To determine the spending account funding requirement for each locomotive, staff developed an equation. The funding requirement is equal to the monetized health costs (e.g., mortalities) that are caused from exposure to locomotive emissions that can be currently calculated.

By operating a ZE locomotive, ZE capable locomotive, or ZE rail equipment or by connecting to wayside power prior to 2030, operators may earn "ZE credit" that can be used to offset their spending account funding requirements. A ZE capable locomotive is one that can be operated in a ZE capacity when in California. Operating a ZE locomotive in a disadvantaged community, as defined by the California Communities Environmental Health Screening Tool (CalEnviroScreen),[14] creates double the credit for the MWhs used within the disadvantaged community. Because doubled ZE credits would be available in such communities, it is likely ZE locomotives would be operated in the most heavily burdened communities first. ZE credits could be used only to reduce spending account funding requirements; they do not have value and are not tradable.

Operators would be able to use funds held in the spending account, along with any interest earned, only in specified ways. Funds held in the spending account can be used for ZE locomotives or infrastructure. Prior to January 1, 2030, operators may also use spending account funds to purchase, lease, rent, remanufacture, or repower a Tier 4 or cleaner

[13] CARB, California Air Districts Webpage, accessed August 7, 2022. (weblink: *https://ww2.arb.ca.gov/california-air-districts*).

[14] Office of Environmental Health Hazard Assessment (OEHHA), CalEnviroScreen 4.0, October 20, 2021, accessed August 7, 2022. (weblink: *https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-40*).

locomotive. After 2030, funds would be limited to the purchase, repower, or remanufacture of a ZE locomotive, ZE capable locomotive, or ZE rail equipment. At any time, operators may also use spending account funds for demonstrations or pilot projects of ZE technology and supporting infrastructure. In the demonstration phase, manufacturers are typically focused on producing single-equipment prototypes or small-volume equipment demonstration and testing projects, whereas projects in pilot phase are larger-scale deployments where issues around manufacturing design, user acceptance, and support can be assessed.

2. In-Use Operational Requirements

Starting January 1, 2030, only locomotives with original engine build dates 23 years old or less would be able to operate in California.

Additionally, on January 1, 2030, all switch, passenger, and industrial locomotives with an original engine build date of 2030 or newer would be required operate in a ZE configuration when in California. Starting January 1, 2035, all line haul locomotives with an original engine build date of 2035 or newer would be required operate in a ZE configuration when in California.

a) Alternative Compliance Plan

The Alternative Compliance Plan (ACP) provides entities the option to propose an alternative to the spending account, in-use operational requirements, or both, provided that they reduce NO_X, PM, and GHG emissions by at least as much as would be achieved using the spending account and in-use operational requirements and by using the assumptions provided in the regulation order. To utilize the ACP, applicants must first receive approval from CARB to ensure that equal or better reductions in NO_X, PM, and GHG emissions would be achieved. ACPs are valid for a 5-year period. After the 5-year period, locomotive operators would need to reapply.

3. Idling Limit

The Proposed Regulation requires all locomotives equipped with an automatic engine shutdown/start-up system to shut off no more than 30 minutes after the locomotive becomes stationary, unless it is for a specifically permitted reason, such as preventing engine damage or performing maintenance.

4. District Level Reporting and Recordkeeping Requirements

The Proposed Regulation requires annual locomotive usage reporting by air district. This is an important aspect that will be used to provide CARB and affected communities with an accurate representation of locomotive activity and the emissions associated with the operation of locomotives throughout California. Locomotive operators will track all applicable locomotive activity by air district in MWh, or in some cases fuel usage, and report

this information to CARB each year. The first report would be due July 1, 2024, for all locomotive activity in 2023.

The reporting requirements do not require real-time reporting, but industry has been moving toward real-time reporting. Many locomotives operating in California and elsewhere in the United States are already equipped with the technology needed to report locomotive activity and location in real time. To achieve this real-time locomotive monitoring and tracking, sensors and other tracking systems can be installed either on locomotives or wayside. Either system would be suitable for the reporting requirements of the Proposed Regulation. CARB does not expect substantial changes from business-as-usual as a result of implementing these reporting requirements, and because this requirement is administrative, it is not expected to result in any direct or indirect environmental impacts.

5. Additional Provisions

a) Historic Railroad Low-Use Exemption

Historic locomotives that do not use more than 10,000 gallons of fuel per year could be exempt from the spending account and in-use operational requirements provisions of the Proposed Regulation. A small number of California historic locomotives are used solely for education, preservation, and historical experience, and use of historic locomotives in their original configuration is key to the educational, preservation, or historical experience. To obtain the historic railroad low-use exemption, historic railroads would have to apply to CARB and report activity annually.

b) Small Business Hardship Extension

For small businesses unable to comply with the requirements of the spending account, the in-use operational requirements, or both, staff has developed a small business hardship extension. To obtain the hardship extension, the small business would be required to submit financial documentation of hardship to CARB for verification.

C. Reasonably Foreseeable Compliance Responses

At the time this Draft EA was prepared, the most likely reasonably foreseeable compliance responses by California locomotive operators to the spending account and in-use operational requirements included the purchase of new locomotives; locomotive remanufactures, retrofit, and repowers; and installation of ZE infrastructure to support ZE locomotives, ZE capable locomotives, and ZE rail equipment. There are several ways locomotives can achieve lower or even zero PM and NO_X emissions, including using electric track (e.g., catenary or third-rail), battery-electric engines, or hydrogen fuel cell-powered engines (either gaseous hydrogen or liquid hydrogen). Locomotives can be freshly manufactured to use only ZE technologies, can be freshly manufactured to use a hybrid approach, or can be retrofit to use either ZE or a hybrid approach. Different technologies may be better suited to different types of rail applications, such as line haul versus passenger locomotives and freight versus switch

locomotives. Different technologies may be adopted because of factors such as economics, environmental impacts, safety hazards, and public acceptability.[15] Given the uncertainty regarding how regulated entities may comply with the Proposed Regulation, it is not reasonable for CARB to assume adoption of any of the following discussed technologies in specific locations in California. Therefore, the following discussion will only generally assess the most likely compliance responses to the Proposed Regulation across the state.

Only the compliance responses that could have significant environmental impacts are discussed in this Draft EA. Locomotive modifications that would not require new manufacturing facilities would not have a significant environmental impact and are not included in the analysis.

1. Purchase and Operation of New Locomotives

Locomotive turnover may be largely affected by the in-use operational requirements. While retirement of older locomotives and the purchase of newer, cleaner locomotives is not required under the Proposed Regulation—and is not the only potential response to the Proposed Regulation—it is a likely cost-effective scenario for many locomotive operators.

In 2030, approximately 68 percent of all locomotives operating in the state may be retired from operating in California because of the in-use operational requirements and natural turnover. This would likely force accelerated purchases of new locomotives. CARB staff estimates that approximately 13,000 ZE locomotives could be manufactured and purchased over 30 years for UP's and BNSF's national fleets, combined.

Under the Proposed Regulation, spending account funds would be allowed to be used only for the purchase, rental, remanufacture, or repower of Tier 4 or cleaner locomotives until 2030 and ZE locomotives in 2030 and later. (Spending Account funds may also be used for certain ZE pilot projects and for ZE infrastructure to support locomotive activity. While the Proposed Regulation does not require that funds be spent—or on what time period—it is assumed here that, as economically rational actors, locomotive operators will put this money to work as soon as they are able.) Locomotives purchased, rented, remanufactured, or repowered using spending account funds would most likely replace older, dirtier locomotives operating in California because that would represent the most likely cost-effective scenario.

Starting in 2030, under the in-use operational requirements, only locomotives with original engine build dates less than 23 years of age may operate in California unless using a ZE configuration. This requirement may cause operators to remove locomotives from California,

[15] U.S. Department of Transportation and Federal Railroad Administration, Study of Hydrogen Fuel Cell Technology for Rail Propulsion and Review of Relevant Industry Standards, June 2021. (weblink: https://railroads.dot.gov/sites/fra.dot.gov/files/2021-06/Study%20of%20Hydrogen%20Fuel%20Cell%20Tech.pdf).

either by retiring them or by transitioning operations elsewhere. By restricting the use of locomotives 23 years of age and older, locomotive operators would need to use newer, cleaner locomotives to replace locomotives no longer allowed to operate in California because of the in-use operational requirements.

Additionally, the in-use operational requirements would require all switch, industrial, and passenger locomotive engines operating in California with an original engine build date of 2030 or a more recent year to operate in a ZE configuration. In 2035, any freight line haul locomotive engine operating in California with an original engine build date of 2035 or a more recent year would be required to operate in a ZE configuration.

One of the main goals of the Proposed Regulation is to eliminate in-state use of the oldest and dirtiest locomotives operating in California. The spending account and in-use operational requirements may accelerate locomotive turnover when compared to existing conditions. Accelerated turnover could result in the need to develop and operate new locomotive manufacturing facilities and/or expand existing facilities to accommodate the manufacturing processes. The majority of locomotive manufacturing within the United States is currently and is anticipated to continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[16] and Indiana locations,[17] similar to existing conditions.

2. Battery Electric Locomotives and Charging

The Proposed Regulation may result in locomotive operators to remove older, dirtier locomotives from use in California, or may result in the operators retrofitting their older, dirtier locomotives to be ZE Capable. CARB's proposed spending account and in-use operational requirements may therefore increase modifications to existing locomotives and/or increase the production and operation of battery-electric locomotives and associated charging infrastructure. An increase in use of battery-electric locomotives or battery-electric railcar equipment could increase the production of electricity, reduce the rate of oil and gas extraction, and result in associated increases in lithium and platinum mining and exports from source countries or other states.

For battery-electric locomotives and railcar equipment, operators may need to install equipment such as new high-voltage cable lines, power meters, and circuit breaker main cabinets to accommodate charging infrastructure. Additional electrical substations may also be required. Substations are used to convert electricity from high-voltage transmission lines to a lower voltage and then to distribute it to an end use, such as locomotive charging.

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[16] Trains Magazine, Wabtec's Grove City plant a global source of diesel engines, 2019, accessed August 7, 2022. (weblink: *https://www.trains.com/trn/news-reviews/news-wire/30-wabtecs-grove-city-plant-a-global-source-of-diesel-engines/*).

[17] Progress Rail, United States Locations, 2022, accessed August 7, 2022. (weblink: *https://www.progressrail.com/en/Segments/GlobalLocations/NorthAmerica.html*).

Development of substations could include construction of concrete pads that house equipment like transformers, power circuit breakers, and high-voltage load break interrupters. Construction equipment, workers, and material deliveries for power utility modifications could be needed at railyards and industrial facilities, as well as in areas subject to upgrading along the utilities' existing infrastructure. In rare cases, additional power generation may be needed to accommodate electrical loads required by locomotive charging. However, given the widespread availability of electrical power sources, it would be speculative to assume new substations would be needed and, if so, where they would be located. Therefore, analysis of such facilities is not included at this time.

Increase in demand for lithium-ion-based batteries could require an increase in manufacturing and recycling facilities and associated increases in lithium mining and exports from countries with raw mineral supplies (e.g., Chile, Argentina, and China). The United States is also a source for lithium. For example, a mining operation currently exists in Nevada, and a pilot project is underway at the Salton Sea in California.[18] Disposal of batteries would be subject to, and comply with, existing laws and regulations governing solid waste and hazardous waste, such as California's Universal Waste Rule (Title 22 CCR Division 4.5, Chapter 23). That is, disposal of used batteries into solid waste landfills is prohibited; however, batteries could be refurbished or reused, recycled, or disposed of as hazardous waste. To meet an increased demand for refurbishing or reusing batteries, it is anticipated that new facilities or modifications to existing facilities would be needed.

3. Hydrogen Locomotives and Infrastructure

CARB's proposed spending account and in-use operational requirements may increase modifications to existing locomotives and/or production and operation of hydrogen-powered locomotives and construction and use of hydrogen fueling infrastructure. This would reduce rates of oil and gas extraction and may require construction of new hydrogen generation and fueling facilities. For purposes of the regulation, a locomotive operating on a hydrogen fuel cell or fuel cell/battery combination would be considered either a ZE or a ZE capable locomotive, depending on whether it retained a diesel generator as a power option.

Hydrogen locomotives generally use a hybrid configuration, consisting of hydrogen fuel cells, batteries, and electric traction motors. The fuel cells convert the fuel source (hydrogen) into electricity, which provides power to the traction motors (the motors used to move the locomotive). The hydrogen fuel source would be tendered, meaning the hydrogen would be housed in a special railcar for holding fuel. Thus, manufacturing of additional hydrogen tender railcars may also result from the Proposed Regulation.

[18] New Energy Nexus, Report: Building Lithium Valley, Opportunities and Challenges Ahead for Developing California's Battery Manufacturing Ecosystem, September 2020. (weblink: *https://efiling.energy.ca.gov/GetDocument.aspx?tn=237271&DocumentContentId=70453*).

Early development would likely require hydrogen to be distributed by truck or brought in by train from facilities outside of the locations where locomotives operate, such as railyards and industrial facilities. At a large scale, on-site generation of hydrogen is the most reasonable compliance response, and the necessary facilities could be constructed adjacent to or near existing railyards or other industrial facilities so the fuel could be used for other hydrogen-fueled equipment. An on-site generation facility would likely be steam methane reforming if authorized, which could include natural gas feedstock, and electrolysis, which is powered by electricity.

Each hydrogen plant would have different siting requirements dependent on the location. Table 2, below, describes the facility types and typical site requirements.

Table 2: Primary Siting Requirements for Hydrogen Plants[19]

Facility Type	Typical Facility Siting Requirements
Electrolyzers	High wind and solar resource areas with transmission access or transmission access within 50 miles of demand
Dairy Anaerobic Digesters	Existing dairy farms in clusters of 5 to 10 with an anchor farm of more than 5,000 milking cows
Food and High-Moisture Organic Anaerobic Digesters	Along current and historical landfill disposal routes with adequate area for 100,000 MMBtu per year facility size, existing wastewater treatment, and resource recovery facilities
Thermochemical Conversion Facilities	Forest areas and agricultural areas (crop residue) with site suitable to generate 50,000 kilograms per day renewable hydrogen outside nonattainment areas
Steam Methane Reforming Facilities	Outside nonattainment areas, close to natural gas transmission and highway transport
Liquefaction Facilities	Collocated with steam methane reforming facilities or production facilities with production capacity of minimum 30 tonnes hydrogen per day

[19] California Energy Commission, Roadmap for the Deployment and Buildout of Renewable Hydrogen Production Plants in California, June 2020. (weblink: *http://www.apep.uci.edu/PDF_White_Papers/Roadmap_Renewable_Hydrogen_Production-UCI_APEP-CEC.pdf*).

Note: MMBtu = million British Thermal Units.

Prior to construction, new hydrogen projects may require permits/approvals from local air districts, cities, and other agencies. The permits/approvals may vary depending on each project and throughout the project process.

4. Alternative Compliance Plans

Alternative projects could manifest in a number of forms, and it remains unclear whether, where, how, and when this additional compliance option would be used. Even if an alternative compliance plan is approved, that approval does not mean the plan will ultimately be developed or used for compliance with the Proposed Regulation. Operations may change from year to year in response to an array of economic, political, and logistical factors. For these reasons, it would be speculative to predict the impacts from the alternative compliance plan in this Draft EA (Title 14 CCR Section 15145). Therefore, the environmental impacts associated with alternative compliance plans are not included in this analysis.

5. Wayside Power

The Proposed Regulation limits all locomotives from idling longer than 30 minutes, unless they are idling for an authorized reason, such as maintaining brake pressure. Wayside power systems provide temporary plug-in power for locomotives. A locomotive equipped with a charger cable can connect to wayside power when the locomotive engines have been shut down and/or disconnected. Connecting to wayside power eliminates the need for idling a locomotive's engine and reduces emissions. Wayside power also provides benefits, such as a reduction in noise pollution, fuel consumption, and wear and tear on the engines. It is reasonable to assume wayside power could be installed in areas where locomotives idle for extended periods of time, such as at passenger rail stations and maintenance yards.

Wayside power systems generally require the installation of small electrical boxes at sites with existing power infrastructure nearby. Wayside power panels are relatively small structures located in highly disturbed areas, and often no major ground-disturbing work would need to be completed for installation. Therefore, installation and operation of wayside power systems would not result in potential adverse impacts on any of the environmental resource areas analyzed in this Draft EA and are not evaluated further.

D. Summary of Compliance Responses

The purchase, remanufacture, or repower of cleaner locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for new and remanufactured or repowered locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be

conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[20] and Indiana locations,[21] similar to existing conditions. The Proposed Regulation may also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to locations where locomotives typically operate, such as railyards and industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

[20] Ibid., pp.24
[21] Ibid., pp.24

III. Environmental and Regulatory Setting

California Environmental Quality Act (CEQA) Guidelines require an environmental impact report (EIR) to include an environmental setting section that discusses the current environmental conditions in the vicinity of the project. This environmental setting normally constitutes the baseline physical conditions against which an impact is compared to determine whether it is significant (14 CCR Section 15125). For this Draft EA, CARB is using a 2020 baseline because that is the year in which the environmental analysis commenced (the notice of preparation was posted on October 27, 2020).

As discussed in Chapter 1 of this Draft EA, CARB has a CEQA-certified regulatory program and prepares an EA in lieu of an EIR. This Draft EA is a functional equivalent to an EIR under CEQA; therefore, in an effort to comply with the policy objectives of CEQA, an environmental setting and a regulatory setting with environmental laws and regulations relevant to the Proposed Regulation have been included as Attachment A to this Draft EA.

IV. Impact Analysis and Mitigation Measures

A. Approach to the Environmental Impacts Analysis and Significance Determination

This chapter contains an analysis of environmental impacts and mitigation measures associated with the Proposed Regulation. The California Environmental Quality Act (CEQA) states the baseline for determining the significance of environmental impacts would normally be the existing conditions at the time the notice of preparation is published (Title 14 CCR Section 15125[a]). Therefore, significance determinations reflected in this Draft EA are based on a comparison of the potential environmental consequences of the Proposed Regulation with the regulatory setting and physical conditions in 2020 (see Attachment A). For the purpose of determining whether the Proposed Regulation may have a potential effect on the environment, CARB evaluated the potential physical changes to the environment that would result from the reasonably foreseeable compliance responses described in further detail in Chapter 2 of this Draft EA. A table summarizing all the potential impacts and proposed mitigation for each resource area discussed below is included in Attachment B to this document.

The reasonably foreseeable compliance responses associated with the Proposed Regulation are analyzed in a programmatic manner for several reasons: (1) any individual action or activity would be carried out under the same authorizing regulatory authority; (2) the reasonably foreseeable compliance responses would result in generally similar environmental effects that can be mitigated in similar ways (Title 14 CCR Section 15168[a][4]); and (3) while the types of foreseeable compliance responses can be reasonably predicted, the specific location, design, and setting of the potential actions cannot feasibly be known at this time. If a later activity would have environmental effects that are not examined within this Draft EA, the public agency with authority over the later activity may be required to conduct additional environmental review as required by CEQA or other applicable law.

The analysis is based on reasonably foreseeable compliance responses that are based on a set of reasonable assumptions. While the compliance responses described in this Draft EA are not the only conceivable ones, they are the reasonably foreseeable ones; thus, they provide a credible basis for impact conclusions that are consistent with available evidence. In addition, as discussed in Chapter 2 of this Draft EA, the evaluation of certain compliance responses would be speculative under CEQA. Those compliance responses are the use of the Alternative Compliance Plan (ACP) and the use of wayside power. CEQA does not require evaluation of speculative impacts (Title 14 CCR Section 15145). For that reason, an evaluation of effects of the ACP and wayside power is not required and is not included in this analysis. The analysis also includes actions that could likely occur under a broad range of the potential scenarios. The impact discussions reflect a conservative assessment to describe the type and magnitude of effects that may occur (i.e., the conclusions tend to overstate adverse effects) because the specific location, extent, and design of potential new and/or modified facilities cannot be known at this time.

1. Adverse Environmental Impacts

The potentially significant adverse impacts on the environment discussed in this Draft EA, and the significance determinations for those effects, reflect the programmatic nature of the reasonably foreseeable compliance responses of the regulated entities. These reasonably foreseeable compliance responses are described in more detail in Chapter 2 of this Draft EA. This Draft EA addresses broadly defined types of impacts or actions that may be taken by others in the future as a result of implementation of the Proposed Regulation.

This Draft EA takes a conservative approach and considers some environmental impacts as potentially significant because of the inherent uncertainties in the relationship between physical actions that are reasonably foreseeable under the Proposed Regulation and environmentally sensitive resources or conditions that may be affected. This conservative approach tends to overstate environmental impacts in light of these uncertainties and is intended to satisfy the good-faith, full-disclosure intention of CEQA. If and 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 Draft EA would be avoided or reduced to a less-than-significant level.

Where applicable, consistent with CARB's certified regulatory program requirements (Title 17 CCR Section 60004.2), this Draft EA also acknowledges potential beneficial effects on the environment that may result from implementation of the Proposed Regulation. Any beneficial impacts associated with the Proposed Regulation are included in the impact analysis for each resource area listed below.

2. Mitigation Measures

This Draft EA expresses a degree of uncertainty regarding implementation of feasible mitigation for potentially significant impacts. "'Feasible' means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors" (Public Resources Code, Section 21061.1). While CARB is responsible for adopting the Proposed Regulation, it does not have authority over all the potential infrastructure and development projects that could be carried out in response to the Proposed Regulation. Other agencies are responsible for the review and approval, including any required environmental analysis, of any facilities and infrastructure that are reasonably foreseeable, including any definition and adoption of feasible, project-specific mitigation measures, and any monitoring of mitigation implementation. For example, local cities or counties must review and decide whether to approve proposals to construct new facilities; CARB does not have jurisdiction over land use permitting of any potential development associated with the compliance responses (Cal. Const., Article XI, Section 7 ["A county or city may make and enforce within its limits all local, police, sanitary, and other ordinances and regulations not in conflict with general laws."]; *California Building Industry Assn. v. City of San Jose* [2015] 61 Cal.4th 435, 455; *Big Creek Lumber Co. v. County of Santa Cruz* [2006] 38 Cal.4th 1139, 1151–1152; Health and Safety

Code Sections 39000–44474 [CARB's statutory authority provides no authority to regulate local land use permitting].). Additionally, State and/or federal permits may be needed for specific environmental resource impacts, such as take of endangered species, filling of wetlands, and streambed alteration.

Because CARB cannot predict the location, design, or setting of specific projects that may result and does not have authority over implementation of specific infrastructure projects that may occur, the programmatic analysis in this Draft EA does not allow for identification of the precise details of project-specific mitigation. As a result, there is inherent uncertainty regarding the degree of feasible mitigation that would ultimately need to be implemented to reduce any potentially significant impacts identified in this Draft EA.

Given the foregoing, and because of legal factors affecting the feasibility of CARB's proposed mitigation for several of the identified potential significant indirect impacts associated with the Proposed Regulation, CARB's implementation of the identified mitigation measures is infeasible, based on the following: 1) the lack of certainty of the scope, siting, and design details of compliance-response development projects, which prevents CARB from being able to determine the projects' significant environmental impacts; and 2) even if there were certainty with respect to compliance-response development projects and associated significant environmental impacts, CARB lacks the legal authority and jurisdiction to permit these projects, which, inherently, prevents CARB from legally imposing any enforceable mitigation measures on the projects. Therefore, CARB's implementation of the mitigation measures suggested, below, in this EA are legally infeasible to implement and enforce.

Consequently, this Draft EA takes the conservative approach in its post mitigation significance conclusions (i.e., tending to overstate the risk that feasible mitigation may not be sufficient to mitigate an impact to less than significant) and discloses, for CEQA compliance purposes, that potentially significant environmental impacts may be unavoidable, where appropriate. It is also possible that the amount of mitigation necessary to reduce environmental impacts to a less-than-significant level may be far less than disclosed in this Draft EA on a case-by-case basis. It is expected that many potentially significant impacts of facility and infrastructure projects would be avoidable or mitigatable to a less-than-significant level as an outcome of their project-specific environmental review processes, conducted by the appropriate permitting agency with jurisdiction as the lead agency under CEQA.

B. Resource Area Impacts and Mitigation Measures

The following discussion provides a programmatic analysis of the reasonably foreseeable compliance responses that could result from implementation of the Proposed Regulation, described in Chapter 2 of this Draft EA. These impacts are discussed under each environmental resource area in accordance with the topics presented in the Environmental Checklist in Appendix G to the CEQA Guidelines (Title 14 CCR Section 15000 et seq.). These impact discussions are followed by descriptions of the types of mitigation measures that could be required to reduce potentially significant environmental impacts.

1. Aesthetics

Landscape character can be defined as the visual and cultural image of a geographic area. It consists of the combination of physical, biological, and cultural attributes that make each landscape identifiable or unique. Visual character may range from predominately natural to heavily influenced by human development. Its value is related, in part, to the importance of a site to those who view it. Viewer groups typically include residents, motorists, and recreation users.

Impact 1-1: Short-Term Construction-Related Impacts on Aesthetics

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[22] and Indiana locations,[23] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

The construction of new locomotive manufacturing facilities and/or expansion of existing facilities would likely involve the use of large pieces of construction equipment. Construction and modification of these facilities, though likely to occur in areas with consistent zoning

[22] Ibid., pp.24
[23] Ibid., pp.24

where other, similar facilities may already be under construction or modification, could introduce or increase the presence of artificial elements (e.g., heavy-duty equipment, removal of existing vegetation, grading) in areas with national-, State-, or county-designated scenic vistas and/or scenic resources visible from State scenic highways. The visual impact of such development would depend on several variables, including the sensitivity of viewers, the size of the facilities, viewer distance and angle of view, visual absorption capacities, and equipment placement in the landscape. However, temporary introduction of construction in a highly sensitive and natural area, for example, could substantially degrade the area's visual quality. Additionally, construction may require nighttime lighting for security or to accommodate nighttime work. In areas with minimal existing lighting, construction lighting may be a substantial new source of nighttime lighting.

Reasonably foreseeable compliance responses to the Proposed Regulation could also include the installation of additional charging infrastructure for ZE technology. In response to the Proposed Regulation, energy providers could install several hundred to thousands of feet of new conduit from existing overhead poles or underground lines located adjacent to charging infrastructure. The installation of new charging infrastructure may include activities such as trenching to install new cable lines and installation of new power meters and circuit breaker main cabinets, all of which would be installed in the approximate vicinity of existing service areas. New power substations may require construction of an enclosed concrete pad that houses equipment such as transformers, power circuit breakers, and high-voltage load break interrupters. Power outlet vaults could be located above or below ground. Construction associated with compliance responses could also result in pile-driving activities. These activities would introduce tall equipment onto various project sites.

It is reasonably foreseeable that activities associated with new or modified facilities for lithium battery and fuel cell recycling and refurbishment could occur. Additionally, to meet increased demand for hydrogen fuel, new hydrogen generation plants would need to be constructed. However, there is uncertainty as to the exact location or character of construction of any new facilities or modification of existing facilities. It is possible that increased recycling and refurbishment could be performed within existing recycling centers that undergo internal retrofitting with minimal ground-disturbing activity. Because the outward appearance of such facilities would not be affected during their retrofit, these activities would not degrade the visual character or quality of the surrounding area; thus, visual impacts would not be substantial in these cases. However, in cases where new facilities are required, short-term construction-related equipment could be introduced to areas of scenic importance or high visual quality. Heavy-duty equipment, such as dozers, cranes, and others, in addition to construction materials, could degrade the visual quality of a landscape. The addition of these elements could adversely affect aesthetics, including 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 the sensitivity of viewers, the size of the facilities, viewer distance and angle of view, visual absorption capacities, and equipment placement in the landscape. Although temporary, introduction of construction in a highly sensitive and natural area, for

example, could substantially degrade the area's visual quality. Additionally, construction may require nighttime lighting for security or to accommodate nighttime work. In areas with minimal existing lighting, construction lighting may be a substantial new source of nighttime lighting.

Therefore, short-term construction-related aesthetic impacts associated with the Proposed Regulation could be potentially significant.

Mitigation Measure 1-1

The regulatory setting in Attachment A includes applicable laws and regulations that relate to aesthetics. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California could qualify as a "project" under CEQA and be subject to CEQA review. The jurisdiction with primary approval authority over a proposed project is the lead agency, which is required to review the proposed project for compliance with CEQA statutes. To the extent new or modified facilities in California are subject to CEQA, project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices routinely required to avoid and/or minimize impacts on aesthetic resources include the following:

- Proponents of new or modified facilities or infrastructure constructed as a result of reasonably foreseeable compliance responses would coordinate with State or local land use agencies to seek entitlements for development and meet all necessary environmental review requirements (e.g., those under CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.
- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the potentially significant scenic or aesthetic impacts of the project.
- The project proponent would color and finish the surfaces of all project structures and buildings visible to the public to: (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 feasible, 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 structures, topography, and/or vegetation. Temporary visual screens would be used where helpful if existing landscape features did not screen views of the areas.

- All construction, operation, and maintenance areas would be kept clean and tidy. Disturbed soil would be revegetated, and construction materials and equipment would be screened from view and/or are generally not visible to the public, where feasible.
- Siting projects and their associated elements next to important scenic landscape features (or in a setting observed from State scenic highways), national historic sites, national trails, or cultural resources would be avoided to the greatest extent feasible.
- The project proponent would contact the lead agency to discuss the documentation required in a lighting mitigation plan, submit to the lead agency a plan describing the measures that demonstrate compliance with lighting requirements, 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 local land use and/or permitting agencies for individual projects, CARB finds it legally infeasible to implement and enforce this measure. Moreover, because of the programmatic analysis of this EA, which does not allow project-specific details of potential impacts and associated mitigation, there is inherent uncertainty regarding the degree of mitigation that lead agencies may ultimately implement to reduce the potentially significant impacts if it approves these potential projects.

Consequently, while impacts could likely be reduced to a less-than-significant level with mitigation conditions imposed by land use and/or permitting agency acting as lead agencies under CEQA, if and when a project applicant seeks a permit for a compliance-response-related project, this Draft EA takes the conservative approach in its postmitigation significance conclusion and discloses, for CEQA compliance purposes, that short-term construction-related impacts on aesthetics associated with the Proposed Regulation could remain **potentially significant and unavoidable**.

Impact 1-2: Long-Term Operation-Related Impacts on Aesthetics

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[24] and Indiana locations,[25] similar to existing conditions. The

[24] Ibid., pp.24
[25] Ibid., pp.24

Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

Implementation of the Proposed Regulation could result in production of new locomotives. New locomotives are anticipated to be consistent with the visual character of existing locomotives.

Locomotive production is anticipated to occur largely at existing manufacturing facilities. However, the increased production could require the expansion of existing facilities, or introduction of new facilities into the environment. These facilities are most often contained within large warehouse shed-type buildings and are often located within industrial areas that have industrial visual character. However, there is uncertainty as to the exact location or character of new facilities or modification of existing facilities, and their relation to viewers. It is possible that these facilities could be located in areas that support landscapes of high visual character. Where locomotive production could be performed within existing manufacturing centers, these activities would not degrade the visual character or quality of the surrounding area; thus, visual impacts would not be substantial in these cases. However, in cases where new facilities are required, the introduction of new buildings and facilities could degrade the visual quality of a landscape. The addition of these elements could adversely affect aesthetics, including 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 the sensitivity of viewers, the size of the facilities, viewer distance and angle of view, visual absorption capacities, and structures placement in the landscape. Thus, the Proposed Regulation could introduce new structural elements into a highly sensitive and natural area, which could substantially degrade the area's visual quality.

Increased demand for lithium-ion storage batteries and fuel cells could also produce additional demand for lithium and platinum. Worldwide, the majority (80 to 90 percent) of

raw lithium is currently mined and exported from Australia, Chile, Argentina, and Bolivia.[26] Lithium is typically derived from hard rock mining practices or from brine extraction. Hard rock mining, which is typical in Australia and, at the timing of writing this Draft EA, is not practiced within the United States, requires the use of heavy-duty equipment (e.g., crushers, rigs, loaders, cutting equipment, cranes) and could result in harmful visual changes to the natural environment, such as hillside erosion, contamination of surface waters, artificial drainage patterns, subsidence, nighttime lighting, and deforestation. In contrast, brine extraction, which occurs in Chile, Argentina, Bolivia, and the United States, involves vertical pumping of brine, which evaporates to form brown and white cones of salt minerals. It is reasonably foreseeable that increased demand for lithium-ion batteries could cause additional lithium extraction resulting in these types of adverse visual effects in areas where hard rock mining (Australia) and brine extraction activities (Chile, Argentina, Bolivia, and United States) occur. Therefore, operation-related impacts associated with brine extraction could be potentially significant.

Platinum mining is typically conducted in South Africa, Russia, Canada, Zimbabwe, and the United States.[27] Mining is typically done in underground or open pit mines where platinum containing ore is extracted and could result in harmful visual changes to the natural environment, such as hillside erosion, contamination of surface waters, artificial drainage patterns, subsidence, night-time lighting, and deforestation. The platinum-containing substance is then ground down separated. From there, the ore is smelted into matte (metal contained in sulfur). From there, the platinum-containing matte is purified at a precious metals refinery.[28] It is reasonably foreseeable that increased demand for fuel cells could cause additional platinum extraction, resulting in these types of adverse visual effects in areas platinum mining extraction occurs (South Africa, Russia, Canada, Zimbabwe, and the United States). Therefore, operation-related impacts associated with platinum mining could be potentially significant.

Long-term operation-related activities associated with compliance with the Proposed Regulation may require new or additional infrastructure for electrical power. Power substations may require construction of an enclosed concrete pad that houses equipment such as transformers, power circuit breakers, and high-voltage-load (HVL) break interrupters. Power outlet vaults could be located above or below ground. These activities could introduce new equipment to various project sites. These are most likely to occur within existing facilities but could require new facilities in areas that currently do not contain such infrastructure. However, there is uncertainty as to the exact location or character of new facilities or modification of existing facilities, and their relation to viewers. It is possible that

[26] U.S. Geological Survey, Mineral Commodity Summaries, 2022. (weblink: https://pubs.usgs.gov/periodicals/mcs2022/mcs2022.pdf).
[27] Mineral Education Coalition, Periotic Table of Elements, Platinum, n.d., accessed August 7, 2022. (weblink: https://mineralseducationcoalition.org/elements/platinum/).
[28] Bonnie J. Glaister, Gavin M. Mudd, "The environmental costs of platinum–PGM mining and sustainability: Is the glass half-full or half-empty?" Minerals Engineering 23 (2010) 438–450, December 16, 2009.

these facilities could be located in areas that support landscapes of high visual character. Where upgrades may be located within existing facilities, these features would not degrade the visual character or quality of the surrounding area; thus, visual impacts would not be substantial in these cases. However, in cases where new facilities are required, the introduction of new structures and electrical equipment could degrade the visual quality of a landscape. The addition of these elements could adversely affect aesthetics, including 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 the sensitivity of viewers, the size of the facilities, viewer distance and angle of view, visual absorption capacities, and structures placement in the landscape. Thus, the Proposed Regulation could introduce new structural elements into a highly sensitive and natural area, which could substantially degrade the area's visual quality.

Increased use of hydrogen fuel cells and lithium-ion batteries could require a substantial infrastructure that may be in areas of high visual quality. New facilities for the manufacture and distribution of hydrogen fuels would be expected to occur in areas appropriately zoned; however, such facilities could conceivably introduce or increase the presence of visible artificial elements (e.g., heavy-duty equipment, new or expanded buildings) in areas of scenic importance, such as landscapes visible from State scenic highways. The visual impact of such development would depend on several variables, including the type and size of the infrastructure, distance and angle of view, visual prominence, and placement in the landscape. In addition, operation may introduce substantial sources of glare and nighttime lighting for safety and security purposes. These types of impacts could result in significant effects on aesthetic resources.

Therefore, long-term operation-related aesthetics effects could be potentially significant.

Mitigation Measure 1-2

The regulatory setting in Attachment A includes applicable laws and regulations that relate to aesthetics. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California could qualify as a "project" under CEQA and be subject to CEQA review. The jurisdiction with primary approval authority over a proposed project is the lead agency, which is required to review the proposed project for compliance with CEQA statutes. To the extent new or modified facilities in California are subject to CEQA, project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices routinely required to avoid and/or minimize impacts on aesthetic resources include the following:

- Proponents of new or modified facilities or infrastructure constructed as a result of reasonably foreseeable compliance responses would coordinate with State or local land use agencies to seek entitlements for development and meet all necessary

environmental review requirements (e.g., those under CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the potentially significant scenic or aesthetic impacts of the project.
- The project proponent would color and finish the surfaces of all project structures and buildings visible to the public to: (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 feasible, 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 structures, topography, and/or vegetation. Temporary visual screens would be used where needed if existing landscape features did not screen views of the areas.
- All construction, operation, and maintenance areas would be kept clean and tidy. Disturbed soil would be revegetated, and construction materials and equipment would be screened from view and/or are generally not visible to the public, where feasible.
- Siting projects and their associated elements next to important scenic landscape features (or in a setting observed from State scenic highways), national historic sites, national trails, or cultural resources would be avoided to the greatest extent feasible.
- The project proponent would contact the lead agency to discuss the documentation required in a lighting mitigation plan, submit to the lead agency a plan describing the measures that demonstrate compliance with lighting requirements, 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 local land use and/or permitting agencies for individual projects, CARB finds it legally infeasible to implement and enforce this measure. Moreover, because of the programmatic analysis of this EA, which does not allow project-specific details of potential impacts and associated mitigation, there is inherent uncertainty regarding the degree of mitigation that lead agencies may ultimately implement to reduce the potentially significant impacts if they approve these potential projects.

Consequently, while impacts could likely be reduced to a less-than-significant level with mitigation measures imposed by the land use and/or permitting agencies acting as lead agencies for these individual projects under CEQA if and when a project applicant seeks a permit for a compliance-response-related project, this Draft EA takes the conservative

approach in its postmitigation significance conclusion and discloses, for CEQA compliance purposes, that long-term operation-related impacts on aesthetics associated with the Proposed Regulation could remain **potentially significant and unavoidable**.

2. Agriculture and Forestry Resources

Impact 2-1: Short-Term Construction-Related and Long-Term Operation-Related Effects on Agriculture and Forestry Resources

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[29] and Indiana locations,[30] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

Locomotive production is anticipated to occur largely at existing manufacturing facilities. However, the increased production could require the expansion of existing facilities or construction of new facilities. Similarly, the increase in the use of batteries and fuel cells could increase the construction and operation of new or expanded manufacturing facilities across the state. Additionally, the Proposed Regulation may require the development of new

[29] Ibid., pp.24
[30] Ibid., pp.24

hydrogen generation plants to accommodate the increase in hydrogen demand. While these facilities are most often located in areas zoned for industrial uses, which are environments that are developed and disturbed and are unlikely to contain agriculture and forestry resources, it is possible that they could be located on agricultural or forest lands.

There is uncertainty as to the exact locations of these new and modified facilities and therefore their location in relation to agricultural land, including farmland, land zoned for agricultural use, and land under Williamson Act contract. Similarly, it is uncertain where new and modified facilities would be located in relation to forest land and timberland. Construction and modification of these facilities, though likely to occur in areas with appropriate zoning that would not have agricultural or forestry uses, could result in conversion of agricultural land or forest land if they are sited in areas of Prime Farmland, Unique Farmland, Farmland of Statewide Importance, Williamson Act conservation contracts, forest land, or timberland. Some of the conversion could be permanent where facilities are constructed, while temporary conversion may be needed to facilitate temporary construction activities. Many local governments have adopted land use policies to protect important agricultural and forest land from conversion to urban development, including industrial facilities. Land use policies controlling the location of new industrial facilities and diverting development away from agricultural and forest land could avoid some conversion of agricultural and forest land but likely would not prevent all conversion of agricultural and forest land. As a result, this impact could be potentially significant if a substantial amount of land is converted to nonagricultural or nonforest use.

Increased demand for lithium-ion batteries could place additional demand on lithium ore extraction internationally. Lithium ore derived from brines is typically found within desert areas, which are generally not considered valuable land for agricultural or forestry practices; however, lithium ore extracted from hard rock mining could result in the loss of agricultural and forest lands of importance if resources are identified on land used for agriculture or forestry. Similar to an increase in demand for lithium-ion batteries, an increase in demand for fuel cells could result in platinum mining and exports from source countries or other states and increase recycling, refurbishment, or disposal of hydrogen fuel cells. If these activities occur within agricultural or forest lands, they could result in loss of these lands. Therefore, short-term construction-related and long-term operation-related agriculture and forestry resources impacts on ports and other lands associated with implementation of the Proposed Regulation could be potentially significant.

Mitigation Measure 2-1

The regulatory setting in Attachment A includes applicable laws and regulations that relate to agriculture and forestry resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities or infrastructure that would be approved by State or local jurisdictions or jurisdictions outside of California. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California could qualify as a "project" under CEQA and be subject to CEQA review. The jurisdiction with primary

approval authority over a proposed project is the lead agency, which is required to review the proposed project for compliance with CEQA statutes. To the extent new or modified facilities in California are subject to CEQA, project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices routinely required to avoid and/or minimize impacts on agriculture and forestry resources include the following:

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

for the preservation of Important Farmland toward the ultimate purchase of an agricultural conservation easements.

- Participation in any agricultural land mitigation program, including local government maintained, that provides equal or more effective mitigation than the measures listed.

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

Because the authority to determine project-level impacts and require project-level mitigation lies with State or local land use and/or permitting agencies for individual projects, CARB finds it legally infeasible to implement and enforce this measure. Moreover, because of the programmatic analysis of this EA, which does not contain project-specific details of potential impacts and associated mitigation, there is inherent uncertainty regarding the degree of mitigation that lead agencies may ultimately implement to reduce the potentially significant impacts if they approve these potential projects.

Consequently, while impacts would likely be reduced to a less-than-significant level with mitigation measures imposed by the land use and/or permitting agencies acting as lead agencies for these individual projects under CEQA, it cannot be determined with certainty that impacts would be reduced to less than significant given that the authority to require these measures is within the responsibility and jurisdiction of another agency and not CARB. Therefore, this Draft EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that if and when a project applicant seeks a permit for compliance-response-related project, short-term construction-related and long-term operation-related impacts on agriculture and forestry resources associated with the Proposed Regulation could remain **potentially significant and unavoidable**.

3. Air Quality

Impact 3-1: Short-Term Construction-Related Impacts on Air Quality

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of

locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[31] and Indiana locations,[32] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

Implementation of the Proposed Regulation could include construction of new ZE and near-ZE infrastructure or modifications to existing facilities. Any proposed modifications to facilities resulting from any of the measures under the Proposed Regulation would require approvals from the applicable local or State land use authority prior to their implementation. Part of the development review and approval process for projects located in California requires environmental review consistent with California environmental laws (e.g., CEQA) and other applicable local requirements (e.g., local air quality district rules and regulations). The environmental review process would include an assessment of whether implementation of such projects could result in short-term construction-related air quality impacts.

At this time, the specific location, type, and number of construction activities are not known and would be dependent upon a variety of factors that are not within the control or authority of CARB and not within its purview. CARB has not quantified the potential construction-related emission impacts because these figures would be too speculative to provide a meaningful evaluation. Nonetheless, the analysis presented herein provides a good-faith disclosure of the general types of construction emission impacts that could occur with implementation of these reasonably foreseeable compliance responses. Further, subsequent environmental review would be conducted at such time that an individual project is proposed, and land use or construction approvals are sought.

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[31] Ibid., pp.24
[32] Ibid., pp.24

Generally, it is expected that during the construction phase for any facilities, criteria air pollutants and toxic air contaminants 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 could generate fugitive particulate matter (PM) dust emissions, which is the primary pollutant of concern during construction. Fugitive PM dust emissions (e.g., respirable particulate matter [PM_{10}] and fine particulate matter [$PM_{2.5}$]) vary as a function of several 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. It is probable that transport of light equipment and personnel for construction activities would take place using light-duty trucks, while transport of heavy equipment or bulk materials would be hauled in heavy-duty trucks. Exhaust emissions from construction-related mobile sources also include reactive organic gases and oxides of nitrogen (NO_X). These emission types and associated levels fluctuate greatly depending on the type, number, and duration of usage for the different pieces of equipment. CARB implements several regulations with the purpose of reducing PM and NO_X emissions and imposing limits on idling from in-use vehicles and equipment, including the Truck and Bus Regulation, the In-Use Off-Road Diesel-Fueled Fleets Regulation, and the Portable Engine Airborne Toxic Control Measure. Much of the equipment used during the construction phase would be subject to these regulations.

The site preparation phase of construction 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 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 would include soil disturbance- and equipment-related activities (e.g., use of backhoes, bulldozers, excavators, and other related equipment). Based on typical emission rates and other parameters for the above-mentioned equipment and activities, construction activities could result in hundreds of pounds of daily PM and NO_X emissions (amount generated from two to four pieces of heavy-duty equipment working 8 hours per day), which may exceed general mass emissions limits of a local or regional air quality management district depending on the location of the emissions. Thus, implementation of new, or amended, regulations and/or incentives could result in levels that conflict with applicable air quality plans, exceed or contribute substantially to an existing or projected exceedance of State or national ambient air quality standards, or expose sensitive receptors to substantial pollutant concentrations.

Construction of projects may generate short-term odors from the use of diesel-powered construction equipment; however, the duration of these emissions would likely be short term, and the impact would be localized. The extent of the significance of these impacts would be determined by the proximity of a project to sensitive receptors and the duration of

construction schedule. If future potential construction activities are located near the locations of sensitive receptors, construction-related odor impacts could be potentially significant.

Because of the level of information known about the Proposed Regulation, it would be infeasible to model with any degree of accuracy the exact location and magnitude of specific health impacts that could occur as a result of project-level construction-related emissions in specific air basins.

CARB estimates premature death and other health effects related to PM and NO_X exposure based on a peer-reviewed methodology developed by the U.S. Environmental Protection Agency (U.S. EPA) and quantifies health benefits of regulations and programs using an incidence-per-ton methodology. There is an approximate linear relationship between premature deaths and other health outcomes and emission concentrations. This modeling requires characterizing a change in air quality occurring under a policy or other change. There is substantial uncertainty regarding the construction details about compliance responses that would be needed to evaluate health effects related to construction emissions. For example, it is not known if certain kinds of compliance response would be clustered in one area or another, what degree of grading would be needed for each project (which affects PM emissions), or what kind of construction equipment would be used (which affects PM and NO_X emissions); therefore, it would not be possible to determine a total amount of emissions across the state and to use that figure in the incidence-per-ton methodology. As a result, it is not feasible to associate specific health impacts with compliance response construction emissions for the Proposed Regulation. This contrasts with operational emissions, which represent the air quality benefits of the Proposed Regulation. The net emissions reductions resulting from operation of the compliance responses can be modeled and demonstrate a net decrease in emissions, as discussed under Impact 3-2; therefore, conclusions about operational health benefits can be and are made on a broader scale.

Once an applicant develops the proposed plans for the project development, the lead agency will have adequate information from which it can determine project-specific, short-term construction-related impacts on air quality associated with these potential compliance-response development projects. Once the lead agency identifies these project impacts, it can likely reduce them to a less-than-significant level by adopting feasible mitigation at the time of project approval. Notwithstanding the uncertainty of the impacts related to the equally uncertain nature and scope of potential compliance-response development projects, for the sake of full transparency, CARB identified mitigation options, noted below, that lead agencies can and should consider for mitigation of any short-term construction-related impacts on air quality from these future projects. Since implementation and enforcement of mitigation measures are beyond the authority of CARB, however, CARB finds it legally infeasible to adopt and implement these measures on its own.

As a result, short-term construction-related air quality impacts associated with some of the Proposed Regulation measures could be potentially significant.

Mitigation Measure 3-1

The regulatory setting in Attachment A includes applicable laws and regulations that relate to air quality. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California could qualify as a "project" under CEQA and be subject to CEQA review. The jurisdiction with primary approval authority over a proposed project is the lead agency, which is required to review the proposed project for compliance with CEQA statutes. To the extent new or modified facilities in California are subject to CEQA, project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices routinely required to avoid and/or minimize impacts on air quality include the following:

- Proponents of new or modified facilities or infrastructure constructed as a result of reasonably foreseeable compliance responses would coordinate with State or local land use agencies to seek entitlements for development and meet all necessary environmental review requirements (e.g., those under CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.
- Based on the results of the environmental review, proponents shall implement all feasible mitigation to reduce or substantially lessen the potentially significant air quality impacts of the project.
- Project proponents shall apply for, secure, and comply with all appropriate air quality permits for project construction from the local agencies with air quality jurisdiction and from other applicable agencies, if appropriate, prior to construction mobilization.
- Project proponents shall comply with the federal Clean Air Act and the California Clean Air Act (e.g., New Source Review and Best Available Control Technology criteria), if applicable.
- Project proponents shall 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 off-site mitigation funds):
    - For projects located in PM_{10} nonattainment areas, prepare and comply with a dust abatement plan that addresses emission of fugitive dust during construction and operation of the project.
    - Ensure that the cleanest possible construction practices and equipment are used. This includes eliminating idling of diesel-powered equipment and providing the necessary infrastructure (e.g., electric plugs) to support ZE and near-ZE equipment and tools.

- Implement, and plan accordingly for the necessary infrastructure to support the ZE and near-ZE emission technology vehicles and equipment that will be operating on-site. Necessary infrastructure may include the physical (e.g., needed footprint), energy, and fueling infrastructure for construction equipment, on-site vehicles and equipment, and medium heavy- and heavy heavy-duty trucks.
- In construction contracts, include language that requires all off-road diesel-powered equipment used during construction to be ZE, if commercially available. If it is not commercially available, include language that requires such equipment to be equipped with Tier 4 Final or cleaner engines, except for specialized construction equipment in which Tier 4 Final engines are not available. In place of Tier 4 Final engines, off-road equipment can incorporate retrofits such that emission reductions achieved equal or exceed those of a Tier 4 Final engine.
- In construction contracts, include language that requires all off-road equipment with a power rating below 19 kilowatts (e.g., pressure washers, plate compactors) used during project construction to be battery-powered.
- In construction contracts, include language that requires all heavy-duty trucks entering the construction site during the grading and building construction phases be ZE, if commercially available. If they are not commercially available, include language that requires such equipment to be model year 2014 or later. All heavy-duty haul trucks should also meet CARB's lowest optional low-NO_X standard starting in the year 2022.
- In construction contracts, include language that requires all construction equipment and fleets to be in compliance with all current air quality regulations. CARB staff is available to assist in implementing this recommendation.

Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this Draft EA does not attempt to address project-specific details of mitigation, there is inherent uncertainty regarding the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts. Although it is unlikely, even after implementation of Mitigation Measure 3-1, significant impacts on air quality resources could occur.

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

Impact 3-2: Long-Term Operation-Related Impacts on Air Quality

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture

these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[33] and Indiana locations,[34] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

Increased demand for lithium-ion based batteries could increase the need for manufacturing, refurbishing, and recycling facilities domestically and abroad, which may require modifications to or construction of new facilities. Some lithium demand may be met domestically. It is possible that compliance responses may contribute at some level to demand for fuel cells, which could result in platinum mining and exports from source countries or other states and increased recycling, refurbishment, or disposal of hydrogen fuel cells.

The occurrence and severity of odor impacts depend on numerous factors, including the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of the receptors. While offensive odors rarely cause any physical harm, they can be unpleasant and lead to distress among the public and generate citizen complaints to local governments and regulatory agencies. Land uses commonly considered to be potential sources of odorous emissions include wastewater treatment plants, sanitary landfills, food processing facilities, chemical manufacturing plants, rendering plants, paint/coating operations, and agricultural feedlots and dairies.

[33] Ibid., pp.24
[34] Ibid., pp.24

The project could result in the development of industrial land uses that could be a source of odors. However, the actual uses that would be developed are not known at this time, as no specific development projects are currently proposed. For this reason, the degree of impact with respect to potential odors associated with future projects and their effects on adjacent receptors is uncertain. It would be expected that any future sources of odors would be governed by applicable nuisance rules by a local air district; however, CARB cannot ensure that these rules would be applied uniformly such that odor impacts would be avoided.

Despite the dramatic emission reductions and air quality improvements achieved to date, areas of California, including the South Coast Air Basin in southern California and the San Joaquin Valley, continue to exceed the national ambient air quality standards (NAAQS) and the California Ambient Air Quality Standards (CAAQS) for PM_{10}, $PM_{2.5}$, and ozone. The Proposed Regulation would introduce new requirements that would directly reduce emissions associated with locomotive operation.

The Proposed Regulation would induce the deployment of battery-electric technologies. The electricity needed to power electrified locomotives could be provided by California's electricity grid or a compliant distributed generation power source. Air pollutant emissions associated with producing electricity for electrified locomotives would vary depending on the relative shares of ZE/low-emission sources (e.g., hydro, wind, solar) and higher emission sources (e.g., coal- and natural gas-fired power plants) that are used. The relative shares of fuel sources will change over time (and even vary from hour to hour depending on electricity demand and time of a day).

California's Renewables Portfolio Standard (RPS), which was established by legislation enacted in 2002, and its most recent targets were set by Senate Bill (SB) 100, requires that California's load-serving entities procure 60 percent of their retail electricity from eligible renewable sources by 2030. The RPS also established the following interim targets for utilities:

- 33 percent of retail sales by December 31, 2020;
- 44 percent of retail sales by December 31, 2024;
- 52 percent of retail sales by December 31, 2027; and
- 60 percent of retail sales by December 31, 2030.[35]

[35] California Energy Commission, Renewables Portfolio Standard- Verification and Compliance, last accessed February 2, 2022. (weblink: *https://www.energy.ca.gov/programs-and-topics/programs/renewables-portfolio-standard/renewables-portfolio-standard*).

As mentioned in Section 1 of SB 100, "The 100 Percent Clean Energy Act of 2018," California aims for 100 percent of total retail sales of electricity in California to come from eligible renewable energy resources and zero-carbon resources by December 31, 2045.[36]

According to the California Energy Commission, in 2020, 36 percent of all California consumed electricity was sourced from renewable power.[37] As grid power electricity becomes cleaner over time to meet the RPS targets, emission reductions from use of electricity rather than the use of internal combustion engines may shift accordingly. Therefore, the shift to ZE from fossil-fuel internal combustion engines may yield increasing operational air quality benefits over time as the state's electrical grid becomes more renewable pursuant to the RPS. Over the time the Proposed Regulation is in effect (2023-2050), emissions are projected to continue to decrease, relative to both the existing conditions baseline and the projected emissions under a business-as-usual (BAU) scenario.

PM and NO_X emissions associated with the generation of electricity used for charging ZE battery-electric locomotives and for the production of hydrogen fuels (i.e., emissions from power plants that supply electricity to the grid) are not considered in the reduction benefits of the Proposed Regulation. If the marginal load results in an increase in generation, there could be increased criteria pollutant emissions in the same or other air basins, inside or outside of California. However, the Proposed Regulation is likely to lead to only a relatively small incremental generation-related emissions increase because the marginal load increase is expected to be minimal.

The number of battery-electric locomotives is estimated to be approximately 685 in 2050. The amount of electricity needed to charge each locomotive is highly dependent on the megawatt-hour (MWh) and duty cycle of each locomotive. Therefore, the impact on California's power grid cannot be fully known. However, the Proposed Regulation emission inventory (Appendix H) estimates the kilowatt usage that is projected for battery-electric locomotives each year. Battery-electric locomotives are estimated to use 192,500 MWh of power in 2035 and 292,900 MWh of power in 2050. According to the California Energy Commission, California's transportation sector demand (not including locomotives) is projected to consume approximately 31 million MWh of energy in 2035. Transportation electricity demand in 2050 is estimated to be 35.7 million MWh, based on the U.S. Energy Information Administration's projected annual changes in electricity demand from 2035 to 2050.[38] Therefore, use of battery-electric locomotives would account for a 0.62 percent

[36] Senate Bill No. 100, California Renewables Portfolio Standard Program: emissions of greenhouse gases, 2018 (weblink: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB100).

[37] California Energy Commission, Tracking Progress, February 2020, last accessed August 7, 2022. (weblink: https://www.energy.ca.gov/sites/default/files/2019-12/renewable_ada.pdf).

[38] U.S. Department of Energy, Hydrogen Program Plan, 2020. (weblink: https://www.hydrogen.energy.gov/pdfs/hydrogen-program-plan-2020.pdf).

increase in the transportation electricity demand in California in 2035 and 0.82 percent increase in 2050.

The Proposed Regulation may increase electricity and hydrogen consumption while reducing diesel fuel consumption. Hydrogen is projected to be used by 14,014 line-haul locomotives and 110 passenger locomotives respectively, in 2050. The associated increase of hydrogen demand is estimated to be about 203,200 metric tons (MT) in 2050. For comparison, in 2050, the U.S. demand for hydrogen is projected to be between 26 and 63 million MT, with 3 to 27 million MT used as transportation fuel. Therefore, in 2050, use of hydrogen ZE locomotives in California would at most account for 1 percent of U.S. demand and 7 percent of transportation demand and would be well within the projected range of expected demand.

The level of hydrogen demand may require rapid growth in hydrogen sources for transportation but is an expected portion of total future hydrogen demand projected by the U.S. Department of Energy (U.S. DOE). U.S. DOE has projected economywide hydrogen demand two to four times higher than what is used today: between 22 and 41 million MT a year in 2050.[39] Therefore, the hydrogen associated with the Proposed Regulation would help support California's transition to clean transportation, the U.S. DOE Energy Earthshots goals,[40] and the current (2022) federal administration's energy goals.

Production of hydrogen involves releasing hydrogen from organic materials, such as fossil fuels, or from water. This is an energy-intensive process. Although there are several methods used in hydrogen production, CARB assumes that over one-third of hydrogen production in California will be by electrolytic processes. This process involves using electrolyzers that use electricity to split water into hydrogen and oxygen.[41] Although hydrogen production is energy intensive, the amount of hydrogen required to fuel ZE locomotives can encourage continued pairing of renewable energy and hydrogen production. Hydrogen production offers additional value when linked to renewable energy production facilities since excess renewable energy produced during the day can be converted into hydrogen for storage and later use instead of being curtailed.

Generally, upstream emissions from medium- and heavy-duty ZE vehicles and equipment are expected to show greater PM, NO_X, and greenhouse gas (GHG) reductions because total energy use would be much lower and because the upstream emissions associated with electricity and hydrogen production would be less compared with the emissions associated with the use of gasoline, diesel, natural gas, and other fuels.[42] Furthermore, the increase in

[39] Department of Energy, Hydrogen Program Plan, 2020. (weblink: https://www.hydrogen.energy.gov/pdfs/hydrogen-program-plan-2020.pdf).
[40] Department of Energy, Hydrogen Shot, accessed August 8, 2022. (weblink: https://www.energy.gov/eere/fuelcells/hydrogen-shot).
[41] Office of Energy Efficiency and Renewable Energy, Hydrogen Production Processes, accessed March 4, 2022. (weblink: https://www.energy.gov/eere/fuelcells/hydrogen-production-processes).
[42] California Air Resources Board, Advanced Clean Cars II SRIA, 2022. (weblink: https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2022/accii/appc1.pdf).

energy demand and hydrogen fuels would be spread across different railyards, train stations, and maintenance and industrial facilities in the state, rather than concentrated in one particular service area. The discussion under Impact 3-1, above, explains the inherent difficulties that make health-specific modeling infeasible for the potential minor emission increases associated with construction of various projects across the state. Those same considerations apply to modeling potential effects from aspects such as increased electricity generation, as it is not possible to know when and where those increases would occur given the range of potential compliance responses to meet the requirements of the Proposed Regulation. Overall, the Proposed Regulation is expected to considerably reduce emissions across the state in comparison to existing conditions, as set forth in detail in the Staff Report and in this Draft EA. These emissions reductions may lead to substantial net improved health outcomes across the state, as described in the Staff Report.

The main purpose of the Proposed Regulation is to reduce emissions of air pollutants from locomotives to improve air quality. The Proposed Regulation is an action in the 2022 State Strategy for the State Implementation Plan[43] that would help further CARB's federal obligations to attain the NAAQS. Relative to a BAU scenario without the Proposed Regulation, the proposed Regulation is projected to reduce a cumulative total of 389,630 tons of NO_X from 2020 to 2050. In 2030, when comparing the BAU scenario to the Proposed Regulation, NO_X emissions would be reduced by about 56 percent, from 32,896 tons per year (TPY) to 14,338 TPY. From 2020 to 2050, the Proposed Regulation would reduce approximately 7,455 tons of $PM_{2.5}$. In 2030, $PM_{2.5}$ emissions would be reduced about 68 percent, from 659 TPY to 210 TPY, compared to the BAU scenario. For more detail regarding quantified emission reductions associated with the Proposed Regulation, see Chapter VI of the ISOR.

The following figures show the overall emission reductions anticipated from the Proposed Regulation, year by year (2020-2050). Figures 4 and 5 show the anticipated $PM_{2.5}$ and NO_X emissions under the existing conditions baseline (2020), BAU scenario without the Proposed Regulation, and Proposed Regulation over time, respectively. For full details of the emission inventory methodology, see Appendix G to the ISOR.

[43] CARB, Draft 2022 State Strategy for the State Implementation Plan, January 31, 2022. (weblink: *https://ww2.arb.ca.gov/sites/default/files/2022-01/Draft_2022_State_SIP_Strategy.pdf*).

Figure 4: Projected Annual $PM_{2.5}$ Emission Reductions from Locomotives Operating in California Compared to Existing Conditions Baseline (2020) and Without the Proposed Regulation (BAU Scenario)

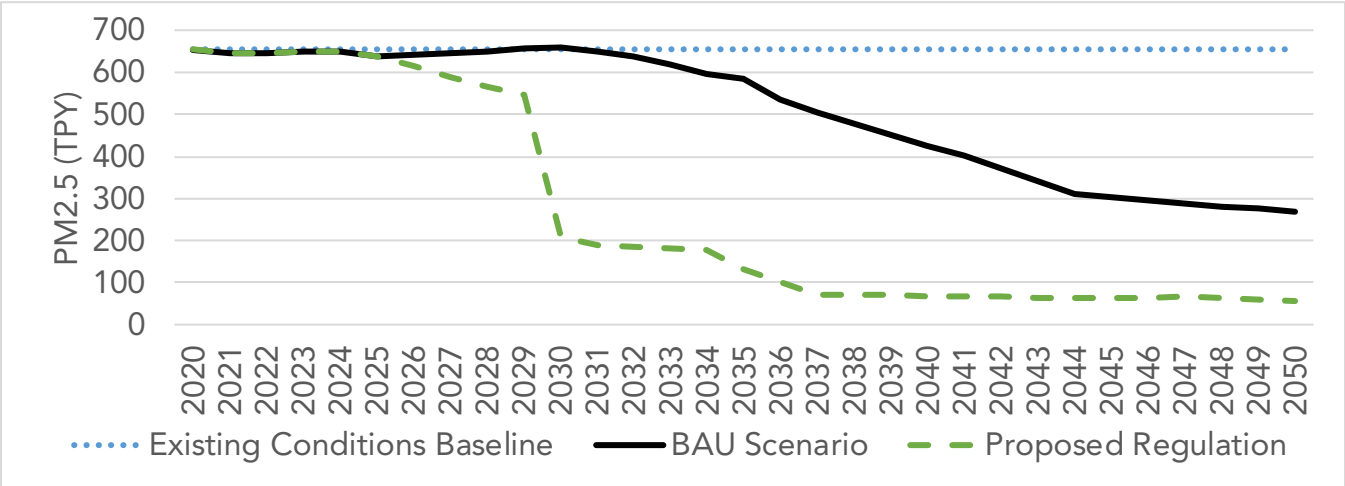
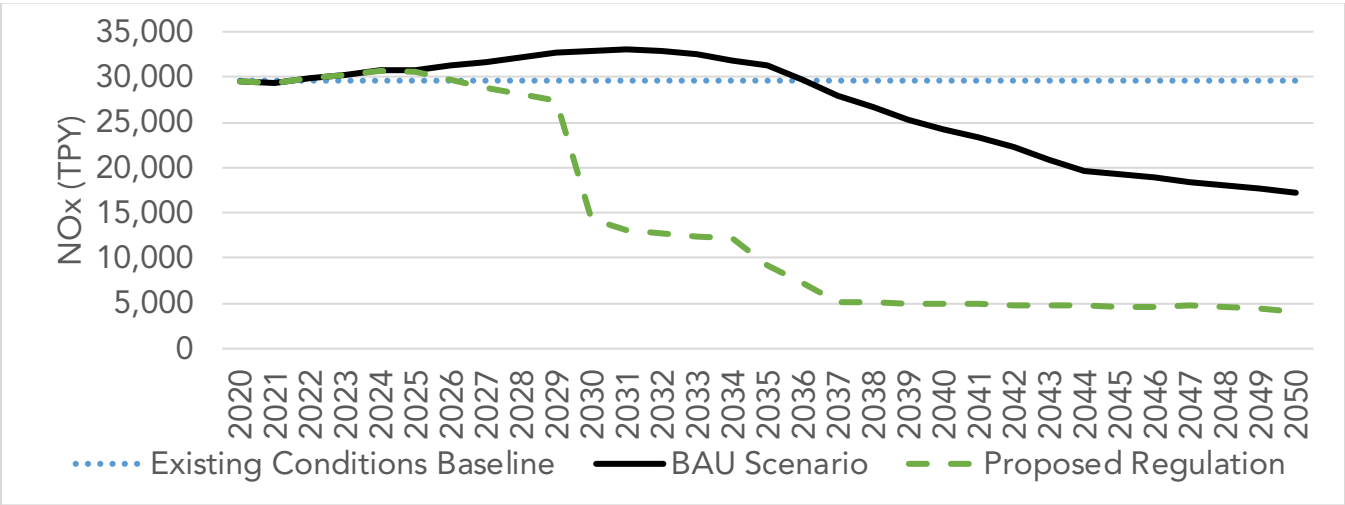


Figure 5: Projected Annual NO_X Emission Reductions from Locomotives Operating in California Compared to Existing Conditions Baseline (2020) and Without the Proposed Regulation (BAU Scenario)



Implementation of the Proposed Regulation would minimize emissions associated from locomotive operations and would assist the State in meeting the NAAQS and CAAQS both regionally and statewide. As discussed in detail in the Staff Report, emission reductions resulting from the implementation of the Proposed Regulation are expected to far outweigh any short-term construction-related emissions increases that may occur and would result in high net positive overall health benefits over the life of the Proposed Regulation.

For these reasons, long-term operation-related air quality impacts would be **beneficial.**

4. Biological Resources

Impact 4-1: Short-Term Construction-Related Impacts on Biological Resources

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[44] and Indiana locations,[45] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

Construction of new manufacturing facilities and ZE infrastructure could result in ground disturbance that could adversely affect biological resources, and the biological resources affected would depend on the specific location of the compliance response. These impacts could occur from modifications to existing habitat, including the removal, degradation, and fragmentation of riparian systems, wetlands, and/or other sensitive natural wildlife habitats and plant communities; interference with wildlife movement or wildlife nursery sites; loss of special-status species; and/or conflicts with the provisions of adopted habitat conservation plans, natural community conservation plans, or other conservation plans or policies to protect natural resources. Although temporary, construction activities related to the implementation of the Proposed Regulation could result in disturbance of protected nesting

[44] Ibid., pp.24
[45] Ibid., pp.24

birds, direct loss of special-status species, disruption of nesting or other behavior related to construction noise or visual disturbance sources (e.g., construction equipment, construction personnel), loss of wildlife habitat, or removal of sensitive habitats if present within proposed construction areas.

Implementation of the Proposed Regulation may result in locomotive construction and/or modification. While these activities would primarily occur at existing facilities, similar to current locomotive construction activities, the increased production could require the expansion of existing facilities or construction of new facilities. Similarly, the increase in the use of batteries and fuel cells could increase the construction and operation of new or expanded manufacturing facilities across the state. Additionally, the Proposed Regulation may require the development of new hydrogen generation plants to accommodate the increase in hydrogen demand. Areas in which locomotives are built, batteries and fuel cells manufactured, and hydrogen generation facilities located generally do not support special-status species or sensitive habitats because they are maintained to facilitate industrial uses. However, there are some plant and animal species that occur in industrially developed areas. Furthermore, infrastructure constructed as a result of implementation of the Proposed Regulation could occur on undeveloped areas that support species and habitat of special consideration. Construction of new facilities and supporting infrastructure could require disturbance of undeveloped areas, such as clearing of vegetation, earth movement and grading, trenching for fuel lines, and paving of delivery areas and roadways. Construction noise may also disturb birds nesting nearby.

An increase in demand for lithium-ion batteries and fuel cells could result in increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells, which could require new or modified facilities. Implementation of the Proposed Regulation could also require substantial new and improved infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to support the use of ZE technology. Similar to impacts described above, direct mortality of individual plants and animals could result from destruction of dens, burrows, or nests through ground compaction, ground disturbance, placement of debris, or vegetation removal. Indirect impacts on species could result from construction noise disturbance that might cause nest or den abandonment and loss of reproductive or foraging potential around the site during construction, transportation, or destruction of equipment and existing structures.

In summary, implementation and compliance with the Proposed Regulation could result in potentially significant impacts on biological resources. Depending on the regulatory status of the species (e.g., listed as endangered under the federal or California Endangered Species Act) and the nature of the habitat disturbance, compliance with permitting requirements under the National Environmental Policy Act, the federal or California Endangered Species Act, Migratory Bird Treaty Act, Clean Water Act Sections 404 and 401, or related State or local laws would be required. It is expected that potential impacts on special-status species and sensitive habitats would be minimized through compliance with the aforementioned protective regulations; however, the terms of permits obtained under these regulations are

unknown as are the precise locations at which construction work would occur. Moreover, it is beyond the authority of CARB to enforce such compliance. Therefore, short-term construction-related biological resources impacts could be potentially significant.

Mitigation Measure 4-1

The regulatory setting in Attachment A includes applicable laws and regulations that relate to biological resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities or infrastructure that would be approved by State or local jurisdictions or jurisdictions outside of California. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California could qualify as a "project" under CEQA and be subject to CEQA review. The jurisdiction with primary approval authority over a proposed project is the lead agency, which is required to review the proposed project for compliance with CEQA statutes. To the extent new or modified facilities in California are subject to CEQA, project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices routinely required to avoid and/or minimize impacts on biological resources include the following:

- Proponents of new or modified facilities or infrastructure constructed as a result of reasonably foreseeable compliance responses to the Proposed Regulation would coordinate with State or local land use agencies to seek entitlements for development and meet all necessary environmental review requirements (e.g., those under CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.
- Based on the results of the environmental review, proponents would implement all feasible mitigation identified in the environmental document to reduce or substantially lessen the significant environmental impacts of the project on biological resources. Any mitigation specifically required for a new or modified facility or infrastructure would be determined by the State or local lead agency.
- Actions required to mitigate potentially significant biological impacts may include the following:
    - Retain a qualified biologist to prepare a biological inventory of site resources prior to ground disturbance or construction. If protected species or their habitats are present, comply with the federal and California Endangered Species Acts and other applicable regulations. Construction and operational planning would require that project activities do not impair important fish or wildlife movement corridors or nursery sites.
    - Retain a qualified biologist to prepare a wetland survey of on-site resources. This survey should be used to establish setbacks and prohibit disturbance of riparian habitats, streams, intermittent and ephemeral drainages, and other

wetlands. Wetland delineation is required by Section 404 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 the nesting season, or establish protective buffers and provide monitoring, as needed, to address project activities that could cause an active nest to fail.
- Prepare site design and development plans that avoid or minimize disturbance of habitat and wildlife resources and prevent stormwater discharge that could contribute to sedimentation and degradation of local waterways. Depending on disturbance size and location, a National Pollutant Discharge Elimination System (NPDES) construction permit may be required from the State Water Resources Control Board.
- Prepare spill prevention and emergency response plans and hazardous waste disposal plans as appropriate to protect against the inadvertent release of potentially toxic materials.
- Plant replacement trees and establish permanently protected suitable habitat at ratios considered acceptable to comply with "no net loss" requirements.
- Keep the site and materials organized, and store materials in a way that discourages wildlife from using them as potential places to hide or nest (e.g., capping pipes, covering trash cans, and emptying trash receptacles consistently and promptly when full).

Because the authority to determine project-level impacts and require project-level mitigation lies with State or local land use and/or permitting agencies for individual projects, CARB finds it legally infeasible to implement and enforce this measure. Moreover, because of the programmatic analysis of this EA, which does not contain project-specific details of potential impacts and associated mitigation, there is inherent uncertainty regarding the degree of mitigation that lead agencies may ultimately implement to reduce the potentially significant impacts if they approve these potential projects.

Consequently, while impacts would likely be reduced to a less-than-significant level with mitigation measures imposed by the land use and/or permitting agencies acting as lead agencies for these individual projects under CEQA, it cannot be determined with certainty that impacts would be reduced to less than significant given that the authority to require these measures is within the responsibility and jurisdiction of another agency and not CARB. Therefore, this Draft EA takes the conservative approach in its postmitigation significance conclusion and discloses, for CEQA compliance purposes, that if and when a project applicant seeks a permit for compliance-response-related project, short-term

construction-related impacts on biological resources associated with the Proposed Regulation could remain **potentially significant and unavoidable**.

Impact 4-2: Long-Term Operation-Related Impacts on Biological Resources

The purchasing of new, cleaner locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for new locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[46] and Indiana locations,[47] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

New locomotives would operate the same as existing locomotives and therefore would not result in impacts on biological resources. Similarly, use of charging infrastructure would require occasional inspection and maintenance that is like existing inspection and maintenance activities. As a result, these activities would not result in operation-related biological resources impacts.

Implementation of the Proposed Regulation could require operation of lithium-ion battery and hydrogen fuel cell facilities and infrastructure, such as recycling or refurbishment facilities, as well as hydrogen generation facilities. Long-term operation of these facilities would often include the presence of workers; movement of automobiles, trucks, and heavy-

[46] Ibid., pp.24
[47] Ibid., pp.24

duty equipment; and operation of stationary equipment. This environment would generally not be conducive to the presence of biological resources located on-site or nearby. For example, operation of a new facility could deter wildlife from using the surrounding habitat or could impede wildlife movement through the area. As is already the case with these facilities, this impact would be substantial if there is not adequate habitat nearby. Vegetation management may be necessary to comply with fire codes and defensible space requirements, which may require tree trimming and other habitat modification that could, for example, result in species mortality or nest failure. Furthermore, operation of facilities could result in the accidental introduction of hazardous substances to the environment, which could adversely affect biological resources.

Increased demand for lithium-ion batteries and hydrogen fuel cells could result in an increase in mining-related activities, including hard rock mining and continental brine extraction for the procurement of lithium ore. Mining of hard rock would require the use of conventional mining practices, including the creation of underground mines and open pits, which would result in the removal of organic material (e.g., bedrock, vegetation). Lithium may also be collected from lake brines and clays. This process involves the pumping of salty groundwater into lagoons where it undergoes evaporation, producing salts containing lithium compounds. An increase in demand for fuel cells could result in an increase in mining and exports from source countries or other states and increase recycling, refurbishment, or disposal of hydrogen fuel cells at existing facilities. If mining activities occur on or near biological resources, which is probable, they could result in loss or degradation of these resources. For example, brine extraction can result in a decline in populations of birds that use hypersaline lagoons.[48] In addition, noise disturbance may occur that may interfere with nesting birds, and the use of heavy equipment could result in loss of special-status species or conflicts with a habitat conservation plan or natural community conservation plan.

Therefore, long-term operation-related impacts on biological resources associated with the Proposed Regulation could be potentially significant.

Mitigation Measure 4-2

The regulatory setting in Attachment A includes applicable laws and regulations that relate to biological resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities or infrastructure that would be approved by State or local jurisdictions or jurisdictions outside of California. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California could qualify as a "project" under CEQA and be subject to CEQA review. The jurisdiction with primary approval authority over a proposed project is the lead agency, which is required to review the proposed project for compliance with CEQA statutes. To the extent new or modified facilities in California are

[48] Fox, Kayla, Environmental Impacts of Lithium Extraction, November 6, 2020, accessed August 8, 2022. (weblink: https://storymaps.arcgis.com/stories/0898df4b1f7e475ab49a4ae23aaed426/print).

subject to CEQA, project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices routinely required to avoid and/or minimize impacts on biological resources include the following:

- Proponents of new or modified facilities or infrastructure constructed as a result of reasonably foreseeable compliance responses to the Proposed Regulation would coordinate with State or local land use agencies to seek entitlements for development and meet all necessary environmental review requirements (e.g., those under CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.
- Based on the results of the environmental review, proponents would implement all feasible mitigation identified in the environmental document to reduce or substantially lessen the significant environmental impacts of the project on biological resources. Any mitigation specifically required for a new or modified facility or infrastructure would be determined by the State or local lead agency. However, future environmental documents prepared by State or local lead agencies could include the following mitigation measures:
    - Prohibit vegetation management activities in the vicinity of raptor nests during the nesting season, or establish protective buffers and provide monitoring as needed to ensure that project activity does not cause an active nest to fail.
    - Maintain site design and development plan features that avoid or minimize disturbance of habitat and wildlife resources and prevent stormwater discharge that could contribute to sedimentation and degradation of local waterways during project operation.
    - Maintain and replace, as needed, trees and permanently protected suitable habitat identified during the construction phase of the project.

Because the authority to determine project-level impacts and require project-level mitigation lies with State or local land use and/or permitting agencies for individual projects, CARB finds it legally infeasible to implement and enforce this measure. Moreover, because of the programmatic analysis of this EA, which does not contain project-specific details of potential impacts and associated mitigation, there is inherent uncertainty regarding the degree of mitigation that lead agencies may ultimately implement to reduce the potentially significant impacts if they approve these potential projects.

Consequently, while impacts would likely be reduced to a less-than-significant level with mitigation measures imposed by the land use and/or permitting agencies acting as lead agencies for these individual projects under CEQA, it cannot be determined with certainty that impacts would be reduced to less than significant given that the authority to require these measures is within the responsibility and jurisdiction of another agency and not CARB.

Therefore, this Draft EA takes the conservative approach in its postmitigation significance conclusion and discloses, for CEQA compliance purposes, that if and when a project applicant seeks a permit for compliance-response-related project, long-term operation-related impacts on biological resources associated with the Proposed Regulation could remain **potentially significant and unavoidable**.

5. Cultural Resources

Impact 5-1: Short-Term Construction-Related and Long-Term Operation-Related Impacts on Cultural Resources

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[49] and Indiana locations,[50] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

Modifications to existing locomotives to incorporate ZE technology would not affect culturally, historically, archaeologically, or paleontologically significant resources because the

[49] Ibid., pp.24
[50] Ibid., pp.24

improvements would be made to the locomotives themselves and therefore would not require any ground-disturbing activities that could result in impacts on these resources.

The Proposed Regulation could result in the construction of a variety of facilities, which could potentially require ground-disturbing activities, such as excavation, grading, and site preparation. The specific design details, siting locations, and soil compaction details for manufacturing facilities are not known at this time. While many locomotive manufacturing facilities would likely be sited outside of California, similar to existing locomotive manufacturing facilities, project construction within the state could involve manufacture, recycling, and refurbishment of batteries and hydrogen fuel cells; hydrogen generation facilities; and new electrical generation, transmission, charging, and wayside power infrastructure. However, there is uncertainty as to the exact location of new facilities and infrastructure. As a result, there is uncertainty as to the presence of culturally, historically, archaeologically, and paleontologically significant resources at future project sites. Furthermore, it is not known what kinds of modifications to existing facilities would occur and whether any ground disturbance would be needed. Nonetheless, it is probable that construction activities for new facilities would require disturbance of undeveloped areas. Therefore, it is foreseeable that undocumented cultural or paleontological resources could be unearthed or otherwise discovered during ground-disturbing and construction activities. Unique archaeological or historical resources might include stone tools, tool-making debris, stone milling tools, shell or bone items, and fire-affected rock or soil darkened by cultural activities. Paleontological resources include fossils. Historic materials might include metal, glass, or ceramic artifacts. Ground disturbance, such as clearing of vegetation, earth movement and grading, trenching for utility lines, erection of new buildings, and paving of lots and roadway associated with the construction of new infrastructure and facilities, could damage cultural, prehistoric, and historic sites; tribal cultural resources; paleontological resources; historic buildings; and heritage landscapes. The reasonably foreseeable compliance responses that could entail demolition activity (e.g., the construction of new manufacturing facilities on sites that support existing structures) could result in the loss of a historically or culturally significant structure. Future new facilities could be located in a region where undocumented prehistoric or historic-era cultural resources may be found.

Following construction, operation of facilities or infrastructure associated with the compliance responses would not require ground disturbance in addition to that performed during construction and modification because operation activities would occur within the footprint of the constructed or modified facility. Therefore, most operational activities would not have the potential to affect archaeological, paleontological, or historical resources. Presence of new infrastructure may, however, change the visual setting of the surrounding area, which could adversely affect historic resources and districts with an important visual component. For example, although it is unlikely such a facility would be sited in a historic district, a new substation may not be consistent with the visual character of a historic district. As a result, operation impacts could be potentially significant.

Moreover, the increased demand for lithium-ion battery storage and fuel cells could result in an increase in lithium and platinum mining at existing extraction facilities. Ground-disturbing activities from hard rock and continual brine mining activities could affect areas and artifacts of cultural, historical, and/or paleontological significance. Although these activities would most likely take place at existing extraction facilities, these facilities may be located in culturally sensitive areas.

Therefore, short-term construction-related and long-term operation-related impacts on cultural resources associated with implementation of the Proposed Regulation could be potentially significant.

Mitigation Measure 5-1

The regulatory setting in Attachment A includes applicable laws and regulations that relate to cultural resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities or infrastructure that would be approved by State or local jurisdictions or jurisdictions outside of California. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California could qualify as a "project" under CEQA and be subject to CEQA review. The jurisdiction with primary approval authority over a proposed project is the lead agency, which is required to review the proposed project for compliance with CEQA statutes. To the extent new or modified facilities in California are subject to CEQA, project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices routinely required to avoid and/or minimize impacts on cultural resources include the following:

- Proponents of new or modified facilities or infrastructure constructed as a result of reasonably foreseeable compliance responses to the Proposed Regulation would coordinate with State or local land use agencies to seek entitlements for development and meet all necessary environmental review requirements (e.g., those under CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.
- Based on the results of the environmental review, proponents would implement all feasible mitigation identified in the environmental document to reduce or substantially lessen the significant environmental impacts of the project on cultural resources. Any mitigation specifically required for a new or modified facility or infrastructure would be determined by the State or local lead agency.
- Actions required to mitigate potentially significant cultural resources impacts may include the following; however, any mitigation specifically required for a 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 the Interior's Professional

Qualifications Standards, as published in Title 36, Code of Federal Regulations, 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.
- Seek guidance from the State Historic Preservation Officer and federal lead agencies, as appropriate, for coordination of nation-to-nation consultations with the Native American tribes.
- Regulated entities should consult with lead agencies early in the planning process to identify the potential presence of cultural properties. The agencies should 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.
- If a resource determined to be significant by the qualified archaeologist (i.e., because the find is determined to constitute either a historical resource or a unique archaeological resource), the archaeologist should work with the project applicant to avoid disturbance to the resource, and if complete avoidance is not possible, follow accepted professional standards in recording any find. Preservation in place is the preferred manner of mitigating impacts on archaeological sites.
- For each project, regulated entities should define the area of potential effects (APE), which is the area where 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.
- Regulated entities should 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 Paleontological Resources: Standard Procedures, Society of Vertebrate Paleontology*.[51]

[51] Society of Vertebrate Paleontology, Measures for Assessment and Mitigation of Adverse Impacts to Paleontological Resources, 2010. (weblink: https://vertpaleo.org/wp-content/uploads/2021/01/SVP_Impact_Mitigation_Guidelines.pdf).

- Regulated entities should conduct initial scoping assessments to determine whether proposed construction activities, if any, could disturb formations that may contain important paleontological resources. Whenever possible, potential impacts on 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 regulated entity's qualified paleontological resources specialist should 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.
  - 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 State or local land use and/or permitting agencies for individual projects, CARB finds it legally infeasible to implement and enforce this measure. Moreover, because of the programmatic analysis of this EA, which does not contain project-specific details of potential impacts and associated mitigation, there is inherent uncertainty regarding the degree of mitigation that lead agencies may ultimately implement to reduce the potentially significant impacts if they approve these potential projects.

Consequently, while impacts would likely be reduced to a less-than-significant level with mitigation measures imposed by the land use and/or permitting agencies acting as lead agencies for these individual projects under CEQA, it cannot be determined with certainty

that impacts would be reduced to less than significant given that the authority to require these measures is within the responsibility and jurisdiction of another agency and not CARB. Therefore, this Draft EA takes the conservative approach in its postmitigation significance conclusion and discloses, for CEQA compliance purposes, that if and when a project applicant seeks a permit for compliance-response-related project, short-term construction-related and long-term operation-related impacts on cultural resources associated with the Proposed Regulation could remain **potentially significant and unavoidable**.

6. Energy

Impact 6-1: Short-Term Construction-Related Effects on Energy

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[52] and Indiana locations,[53] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

[52] Ibid., pp.24
[53] Ibid., pp.24

Short-term energy expenditures would be required to facilitate manufacturing of new or modification of existing locomotives, lithium-ion batteries, and hydrogen fuel cells. Energy would also be consumed to construct supportive land-based electrical power infrastructure to accommodate increases in charging stations and wayside power systems, such as trenching for conduit lines, adding connection and electrical panels, and installing charging connectors, electrical cables, or other systems. An increase in demand for lithium-ion batteries and fuel cells could result in an extremely small increase in recycling, refurbishment, or disposal of lithium-ion batteries and hydrogen fuel cells, but new facilities are not anticipated. Energy would be expended to construct new infrastructure to support fuel cells and hydrogen fueling infrastructure. Energy for these construction projects would be supplied by an appropriate utility service provider; however, this energy would be inherently short term and would be deemed necessary to enable cleaner technologies, which would result in decreased emissions of criteria air pollutants and toxic air contaminants, thus minimizing potentially adverse environmental effects.

Temporary increases in energy demand associated with construction of new facilities would include fuels, as well as gas and electricity demands. Typical earth-moving equipment that may be necessary for construction includes graders, scrapers, backhoes, jackhammers, front-end loaders, generators, water trucks, and dump trucks. Short-term construction-related activities associated with implementation of the Proposed Regulation would be similar to the construction and maintenance activities already occurring throughout the state. While energy would be required to complete construction for any new or modified facilities or infrastructure projects, it would be temporary and limited in magnitude such that a reasonable amount of energy would be expended.

While all aforementioned compliance responses would require the consumption of energy resources, they would enable the transition to ZE technologies to comply with the provisions of the Proposed Regulation and would not involve the wasteful or inefficient use of energy. A major objective of the Proposed Regulation is to reduce air pollution, emissions of toxic air contaminants, and GHG emissions in the long term, and constructing the necessary infrastructure and technical components to support this objective would require energy. Therefore, while energy demand would increase during the construction of future projects in response to implementation of the Proposed Regulation, these energy expenditures would be necessary to facilitate the actions that would result in environmental benefits, such as reduced air pollution and GHG emissions. Therefore, short-term energy consumption would not be considered unnecessary. Moreover, energy needed to power necessary equipment would not be anticipated to generate high electrical demand beyond baseline energy load, as construction contractors and managers typically manage fuel and energy costs and therefore do not typically allow for substantial fuel and other energy waste. Short-term construction-related energy impacts associated with the Proposed Regulation would be **less than significant**.

Impact 6-2: Long-Term Operation-Related Impacts on Energy

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[54] and Indiana locations,[55] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

Utility service providers would provide the electricity to meet the demand generated from various measures covered under the Proposed Regulation, including those that directly result in the displacement of energy derived from the combustion of fossil fuels to electricity. These include manufacturing processes for new or modified locomotives, and recycling and disposal of batteries, as well as electricity needed for generating and transporting hydrogen fuels and charging of locomotives. The activities affected by the Proposed Regulation could increase local and regional energy use. The level of energy demand generated from these actions and the potential for a change in energy demand would be site-specific and dependent on the location and scale that would occur. Where there are situations with substantial electrical loads, distributed generation resources, or lithium-ion storage batteries

[54] Ibid., pp.24
[55] Ibid., pp.24

could be relied on during periods when total demand is high, and the energy grid is experiencing peak levels of demand.

California's RPS requires that California's load-serving entities procure 60 percent of their retail electricity from eligible renewable sources by 2030. The RPS also established the following interim targets for utilities:

- 33 percent of retail sales by December 31, 2020;
- 44 percent of retail sales by December 31, 2024;
- 52 percent of retail sales by December 31, 2027; and
- 60 percent of retail sales by December 31, 2030.[56]

As mentioned in Section 1 of SB 100, "The 100 Percent Clean Energy Act of 2018," California aims for 100 percent of total retail sales of electricity in California to come from eligible renewable energy resources and zero-carbon resources by December 31, 2045.[57]

According to the California Energy Commission, in 2020, 36 percent of all California consumed electricity was sourced from renewable power.[58]

California's energy capacity is expected to increase as a result of GHG-reducing regulations and policies. To meet the statewide targets of 1990 levels of GHG emissions by 2020 (i.e., Assembly Bill [AB] 32) and 40 percent below 1990 levels of GHG emissions by 2030 (i.e., SB 32), reductions will need to be made from several sectors, including the energy and mobile source sectors. Statewide regulations such as the Zero-Emission Vehicle Mandate, Advanced Clean Fleet Regulation, Advanced Clean Transit Regulation, and Innovative Clean Transit Regulation aim to achieve GHG reductions from the mobile source sector through the deployment of electric and ZE and near-ZE vehicles, which would replace vehicles powered by internal combustion engines. Utilities are working in coordination with the California Public Utilities Commission (CPUC) to fund infrastructure expansion projects to meet this future demand. CPUC is also responsible for regulating electric power procurement and generation and evaluates the necessity for additional power generation by California utilities in both the short and long term.[59]

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[56] California Energy Commission, Renewables Portfolio Standard- Verification and Compliance, accessed February 2, 2022. (weblink: *https://www.energy.ca.gov/programs-and-topics/programs/renewables-portfolio-standard/renewables-portfolio-standard*).

[57] Senate Bill No. 100, California Renewables Portfolio Standard Program: emissions of greenhouse gases, 2018. (weblink: *https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB100*).

[58] California Energy Commission, Tracking Progress, February 2020, accessed August 7, 2022. (weblink: *https://www.energy.ca.gov/sites/default/files/2019-12/renewable_ada.pdf*).

[59] California Public Utilities Commission, 2022. Electric Procurement and Generation, accessed August 8, 2022. (weblink: *https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-power-procurement#:~:text=The%20CPUC%20is%20also%20responsible,the%20long%20and%20short%20term*)

Additional energy capacity in the state would be achieved through improved energy efficiency, energy storage, demand response, and generation of renewable resources. The efficiency of new homes is continually improving through triennial updates to the Parts 6 and 11 of the Title 24 Building Standards Code (California Energy Code and California Green Building Standards Code), which achieve energy reductions through use of mandatory and prescriptive energy efficiency design features and green building practices. The California Energy Code is anticipated to trend toward decarbonization, or the elimination of on-site natural gas combustion to power stoves and water heaters consistent with the findings of the 2018 Integrated Energy Policy Report, which identifies carbonization of the building sector as a major policy shift that will assist the State in meeting its long-term GHG reduction goals (i.e., reducing GHG emissions by 80 percent of 1990 levels by 2050).

The abovementioned factors combine to expand the state's energy capacity as compared to previous years. For example, in-state energy capacity rose from 55,530 megawatts (MW) in 2001 to 81,691 MW in 2021, an increase of 47 percent.60 Additionally, as mentioned above, the California Energy Code is expected to increase the energy efficiency of buildings within the state, which would reduce energy demand generated by the building sector.

Operation of new or expanded facilities could result in an increase in vehicle mileage of workers and result in an increase in gasoline and diesel fuel consumption associated with worker commute trips. However, this increase in vehicle miles traveled (VMT) would facilitate meeting the emission reduction goals and objectives of the Proposed Regulation, which would inherently result in more efficient use of energy and would, therefore, not be considered unnecessary or wasteful.

Appendix F of CEQA lists increased use of renewable energy as an appropriate strategy to mitigate energy impacts. Use of ZE and near-ZE technologies, as discussed above, would divert energy from fossil fuel-powered systems and engines to electrical systems (and other systems, such as fuel cells), which, as mandated by the RPS, will become increasingly more renewable in the coming years. Arguably, through the use of electric and ZE and near-ZE technologies and an increasingly more renewable energy grid, implementation of the Proposed Regulation would improve the efficiency of energy use across the state.

Therefore, implementation of the Proposed Regulation would not result in the wasteful, unnecessary, or inefficient use of energy. Thus, long-term operation-related energy impacts would be **less than significant.**

[60] California Energy Commission, Electric Generation Capacity and Energy, accessed August 8, 2022. (weblink: *https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/electric-generation-capacity-and-energy*)

7. Geology and Soils

Impact 7-1: Short-Term Construction-Related and Long-Term Operation-Related Impacts on Geology and Soils

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[61] and Indiana locations,[62] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

Modifications to existing locomotives to incorporate ZE technology would not affect geology and soils because the improvements would be made to the locomotives themselves and therefore would not require any ground-disturbing activities that could exacerbate geologic hazards.

The Proposed Regulation could result in the construction of a variety of facilities that could potentially require ground-disturbing activities, such as excavation, grading, and site preparation. The specific design details, siting locations, and soil compaction details for manufacturing facilities are not known at this time. While many locomotive manufacturing

[61] Ibid., pp.24
[62] Ibid., pp.24

facilities would likely be sited outside of California, similar to existing locomotive manufacturing facilities, project construction within the state could involve manufacture, recycling, and refurbishment of batteries and hydrogen fuel cells; hydrogen generation facilities; and new electrical generation, transmission, charging, and wayside power. Construction of new infrastructure and facilities could cause adverse geologic impacts, such as erosion from vegetation grubbing and grading. Additionally, construction and operation of these facilities could be subjected to existing geologic hazards, such as seismic shaking, liquefaction, landslides, unstable soils, and other potential vulnerabilities. However, there is uncertainty as to the exact location of new facilities and infrastructure. As a result, there is uncertainty as to geologic conditions at future project sites. Furthermore, it is not known what kinds of modifications to existing facilities would occur and whether any ground disturbance would be needed.

Nonetheless, it is probable that construction activities for new facilities would require disturbance of undeveloped areas, such as clearing of vegetation; earth movement and grading; trenching for utility lines; erection of new buildings; and paving of parking lots, delivery areas, and roadways. These activities could have the potential to adversely affect soil and geologic resources in construction areas. Because of the nature of construction activities (e.g., no groundwater injection is anticipated), construction and operation of these facilities would not exacerbate seismicity. The level of susceptibility to seismicity-related geologic hazards like erosion and landslides varies by location and geologic conditions at the site.

In unusual cases in which facilities would be sited in areas without sewer systems, it would be expected that new facilities would be sited on lands capable of supporting septic tanks or alternative wastewater disposal. However, there is inherent uncertainty surrounding the location and magnitude of such facilities, which could also be located outside of California. Therefore, it is conceivable that a facility could be located on soils incapable of supporting facility-generated wastewater.

Lastly, implementation of the Proposed Regulation could result in increased demand for lithium-ion batteries and fuel cells, which could cause a surge in lithium and platinum mining activity within the United States, as well as internationally. Mining would have adverse effects on erosion from potential loss of forests and soil disturbance.[63]

Therefore, short-term construction-related and long-term operation-related impacts on geology and soils associated with the Proposed Regulation could be potentially significant.

Mitigation Measure 7-1

The regulatory setting in Attachment A includes applicable laws and regulations that relate to geology and soils. CARB does not have the authority to require implementation of mitigation

[63] Kinhal, Vijayalaxmi, How Does Mining Affect the Environment, accessed November 11, 2020. (weblink: *https://greenliving.lovetoknow.com/How_Does_Mining_Affect_the_Environment*).

related to new or modified facilities or infrastructure that would be approved by State or local jurisdictions or jurisdictions outside of California. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California could qualify as a "project" under CEQA and be subject to CEQA review. The jurisdiction with primary approval authority over a proposed project is the lead agency, which is required to review the proposed project for compliance with CEQA statutes. To the extent new or modified facilities in California are subject to CEQA, project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices routinely required to avoid and/or minimize geology and soils impacts include the following:

- Proponents of new or modified facilities or infrastructure constructed as a result of reasonably foreseeable compliance responses to the Proposed Regulation would coordinate with State or local land use agencies to seek entitlements for development and meet all necessary environmental review requirements (e.g., those under CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.
- Based on the results of the environmental review, proponents would implement all feasible mitigation identified in the environmental document to reduce or substantially lessen the significant environmental impacts of the project on geology and soils. Any mitigation specifically required for a new or modified facility or infrastructure would be determined by the State or local lead agency. However, future environmental documents prepared by State or local lead agencies could include the following mitigation measures:
- Prior to the issuance of any development permits, proponents of new or modified facilities or infrastructure constructed as a result of reasonably foreseeable compliance responses to the Proposed Regulation should prepare a geotechnical investigation/study, which could 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; mineral resources; and the presence of hazardous materials.
- Proponents of new or modified facilities or infrastructure constructed as a result of reasonably foreseeable compliance responses to the Proposed Regulation would provide a complete site grading plan and a drainage, erosion, and sediment control plan with applications to applicable lead agencies. Proponents would avoid locating facilities on steep slopes, on alluvial fans and in other areas prone to landslides or flash floods, and in gullies or washes as much as possible.

Because the authority to determine project-level impacts and require project-level mitigation lies with State or local land use and/or permitting agencies for individual projects, CARB finds it legally infeasible to implement and enforce this measure. Moreover, because of the programmatic analysis of this EA, which does not contain project-specific details of potential impacts and associated mitigation, there is inherent uncertainty regarding the degree of

mitigation that lead agencies may ultimately implement to reduce the potentially significant impacts if they approve these potential projects.

Consequently, while impacts would likely be reduced to a less-than-significant level with mitigation measures imposed by the land use and/or permitting agencies acting as lead agencies for these individual projects under CEQA, it cannot be determined with certainty that impacts would be reduced to less than significant given that the authority to require these measures is within the responsibility and jurisdiction of another agency and not CARB. Therefore, this Draft EA takes the conservative approach in its postmitigation significance conclusion and discloses, for CEQA compliance purposes, that if and when a project applicant seeks a permit for a compliance-response-related project, short-term construction-related and long-term operation-related impacts on geology and soils associated with the Proposed Regulation could remain **potentially significant and unavoidable**.

8. Greenhouse Gas Emissions

Impact 8-1: Short-Term Construction-Related and Long-Term Operation-Related Impacts on Greenhouse Gas Emissions

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[64] and Indiana locations,[65] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel would require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase

[64] Ibid., pp.24
[65] Ibid., pp.24

in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

Increased production of new locomotives and locomotive remanufacture and repower work may occur in response to the Proposed Regulation and is expected to occur both inside and outside of California. However, there would be no foreseeable new construction or modification of existing locomotive manufacturing facilities in response to the Proposed Regulation as most of the locomotive demand would be concentrated in 2029 to 2031 in response to the Proposed Regulation in-use operational requirements. Following the anticipated large demand increase in 2029 to 2030, locomotive manufacturing is anticipated level off. CARB staff assumes current manufacturing facilities to be capable of supplying locomotives for the Proposed Regulation.

It is not possible to predict exactly where project-related improvements would occur or what each project would involve. Modifying an existing railyard or station for new or expanded charging capabilities may include trenching to install new power cable lines and installation of power meters and power pedestals, all of which would be installed near existing service areas. Charging equipment may require construction of an enclosed concrete pad that houses equipment (e.g., transformers, cables, power circuit breakers). Depending on the size and scope of the modifications to facilities, construction equipment could range from earth-moving equipment, such as backhoes and excavators, to hand and power tools to install smaller devices, such as valves and flanges. Construction activities might include demolition and excavation, backfilling, compacting, paving, and equipment deliveries. Construction may last up to a year at each location when considering the development, permitting, and construction phases. However, because of the small size and scope of charging infrastructure, CARB staff assumes actual construction activities to occur for less than 6 months at each given project site.

Modifications and upgrades to maintenance facilities and railyards to accommodate gas or liquid hydrogen fueling would include improvements, such as storage, refueling, and required safety improvements. Often, railyards and maintenance facilities are located in heavily disturbed areas that include vacant, industrial-zoned land. A newly established hydrogen refueling station may require the construction of a hydrogen refueling pad and supporting infrastructure improvements, retrofits to ventilation (e.g., modified electrical equipment, fans), spark-proofing on electrical wiring, and installation of a hydrogen detection system.

This construction activity could require use of vehicles and equipment that would consume fuel and emit GHG emissions for construction activities, materials transport, and worker commutes. Construction-related GHG emissions would be temporary and last for only the duration of construction. Local agencies, such as air pollution control districts, are generally charged with determining acceptable thresholds of GHG emissions, measured in metric tons of carbon dioxide equivalent per year ($MTCO_2e$/year). Quantification of short-term

construction-related GHG emissions is generally based on a combination of methods, including the use of exhaust emission rates from emissions models, such as OFFROAD 2007 and EMFAC 2021. These models require consideration of assumptions, including construction timelines and energy demands (e.g., fuel and electricity).

Air districts differ in their treatment of construction emissions. For instance, the Sacramento Metropolitan Air Quality Management District recommends that construction emissions be compared to a bright-line threshold of significance of 1,100 $MTCO_2e$ per year.[66] Other air districts, such as the Bay Area Air Quality Management District, do not have a numerical threshold for assessing the significance of construction-generated GHG emissions.[67] Additionally, other air districts, such as the South Coast Air Quality Management District, recommend amortizing construction emissions over a 30-year period and adding these emissions to total operational emissions.[68]

Depending on project size, the generation of construction emissions is inherently short term when compared to operational emissions, which continue to be emitted until a project or facility has been decommissioned. Nevertheless, GHGs typically have a long atmospheric lifespan. Therefore, construction emissions must be considered in the overall context of a project. Thus, it is important that the Proposed Regulation's benefits outweigh the emissions from construction.

The Proposed Regulation would achieve GHG benefits for the state of California relative to the BAU scenario. The Proposed Regulation is projected to reduce approximately 21.86 million metric tons of CO_2 equivalent ($MMTCO_2e$) of GHG emissions from 2020 to 2050 (quantified as CO_2e as defined above). In 2035, when comparing the Proposed Regulation to the BAU scenario, GHG emissions would be reduced by 396,000 $MTCO_2e$, or by about 11 percent, from 3,700,000 $MTCO_2e$ to 3,310,000 $MTCO_2e$. Overall, the GHG emission reductions achieved by the Proposed Regulation compared to the BAU scenario would amount to about 19 percent of the total GHG emissions, from 2020 to 2050. For more details regarding quantified emission reductions from the Proposed Regulation, see Chapter V of the ISOR.

Staff has estimated the Proposed Regulation emissions inventory from 2020 to 2050. Figures 6, 7, and 8 show the anticipated GHG emissions under the BAU scenario and the Proposed

[66] Sacramento Metropolitan Air Quality Management District, Greenhouse Gas Emissions, CEQA Guide, February 2021. (weblink: *http://www.airquality.org/LandUseTransportation/Documents/Ch6GHG2-26-2021.pdf*).

[67] Bay Area Air Quality Management District, CEQA Air Quality Guidelines, 2017. (weblink: *https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en*).

[68] South Coast Air Quality Management District. Draft Guidance Document – Interim CEQA Greenhouse Gas Significance Threshold, 2008. (weblink: *http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgattachmente.pdf*).

Regulation, year by year (2020-2050). For full details of the emission inventory methodology, see Appendix G, CARB's 2022 In-Use Locomotive Emission Inventory: Regulatory Scenarios.

To fully capture GHG emissions from locomotives operating in California, staff analyzed the total well-to-wheel (WTW) GHG emissions, which includes upstream emissions associated with producing and transporting electricity or hydrogen. WTW emissions can be separated into two components. One is the upstream emissions, or well-to-tank (WTT) GHG emissions, and the other is the tailpipe emissions, or tank-to-wheel (TTW) GHG emissions. The GHG emissions for the Proposed Regulation were calculated considering both tailpipe and upstream emissions to allow direct comparison between the global impact of diesel and ZE locomotive technologies.

WTT emissions were quantified using the same approach used for the 2020 Mobile Source Strategy[69] with updated assumptions for fuel and energy supply. WTT emissions include sources from fuel production facilities, such as electricity power plants, hydrogen, biofuel production, and refineries, in addition to fuel feedstock collection (e.g., crude oil extraction from in-state wells) and finished fuel product transportation and distribution. The WTT emission factors capture GHG emission sources within the scope of AB 32. WTT emission factors for gasoline, diesel, and hydrogen fuels were developed based on California-specific data, including Low Carbon Fuel Standard (LCFS) data,[70] CEIDARS/CEPAM,[71] and CA-GREET,[72] while considering LCFS compliance scenarios that require fuel production with decreasing carbon intensities and SB 1505.[73] Electricity emission factors reflect compliance with SB 100 RPS targets.[74]

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[69] California Air Resources Board, 2020 Mobile Source Strategy, Appendix A – Upstream Energy Emission Factors for Scenario Modeling, October 28, 2021. (weblink: https://ww2.arb.ca.gov/sites/default/files/2021-09/Proposed_2020_Mobile_Source_Strategy.pdf).

[70] Data includes crude supply, carbon intensity, and in-state production from LCFS data dashboard and LCFS compliance scenario. (weblinks: https://ww3.arb.ca.gov/fuels/lcfs/dashboard/dashboard.htm and https://www.arb.ca.gov/fuels/lcfs/2018-0815_illustrative_compliance_scenario_calc.xlsx?_ga=2.155021808.917945968.1597354480-1389483658.1577128071).

[71] California Air Resources Board, 2018. Criteria Pollutant Emission Inventory Data. (weblink: https://ww2.arb.ca.gov/criteria-pollutant-emission-inventory-data).

[72] California Air Resources Board, 2019. CA-GREET3.0 Model. (weblink: https://www.arb.ca.gov/fuels/lcfs/ca-greet/ca-greet30-corrected.xlsm?_ga=2.247817287.1944131420.1600710547-1389483658.1577128071).

[73] Senate Bill (SB) 1505 requires at least 33.3 percent of the hydrogen dispensed by fueling stations that receive state funds be made from eligible renewable energy resources. (weblink: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=200520060SB1505). Based on current hydrogen supply from LCFS reporting data and future production investments, the supply of renewable hydrogen can be, at least, maintained at 40 percent of hydrogen fuel demand.

[74] SB 100 requires renewable energy and zero-carbon resources supply 100 percent of electric retail sales to end-use customers by 2045. For renewable source target in a specific year. (weblink: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100).

Figure 6: Projected Annual Well-to-Wheel GHG Emissions from Locomotives Operating in California Compared to Existing Conditions Baseline (2020) and Without the Proposed Regulation (BAU Scenario)

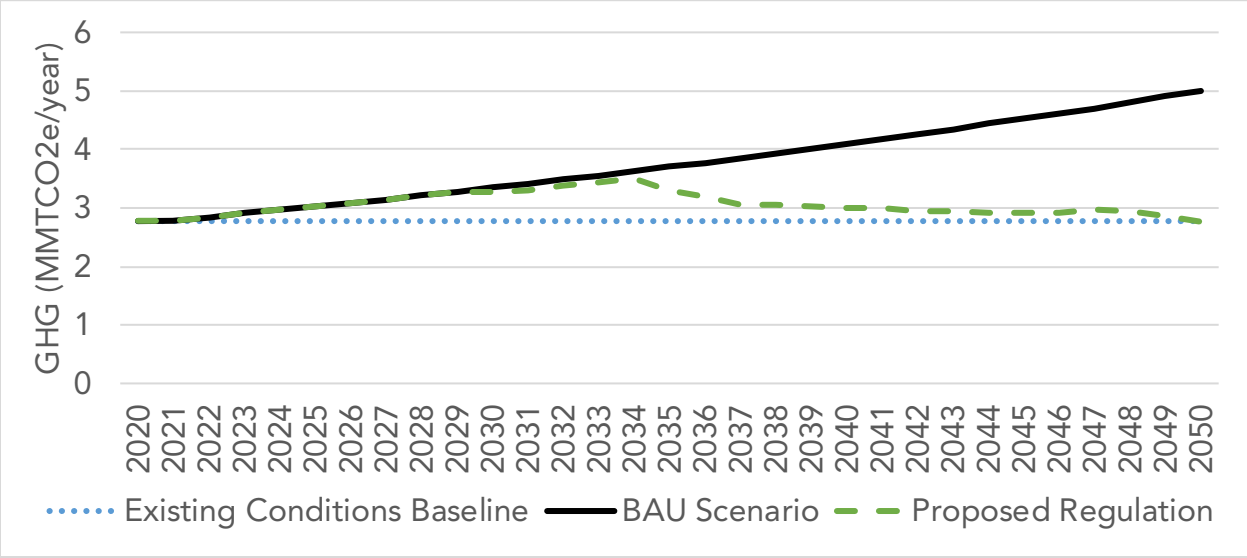


Figure 7: Projected Annual Tank-to-Wheel GHG Emissions from Locomotives Operating in California Compared to Existing Conditions Baseline (2020) and Without the Proposed Regulation (BAU Scenario)

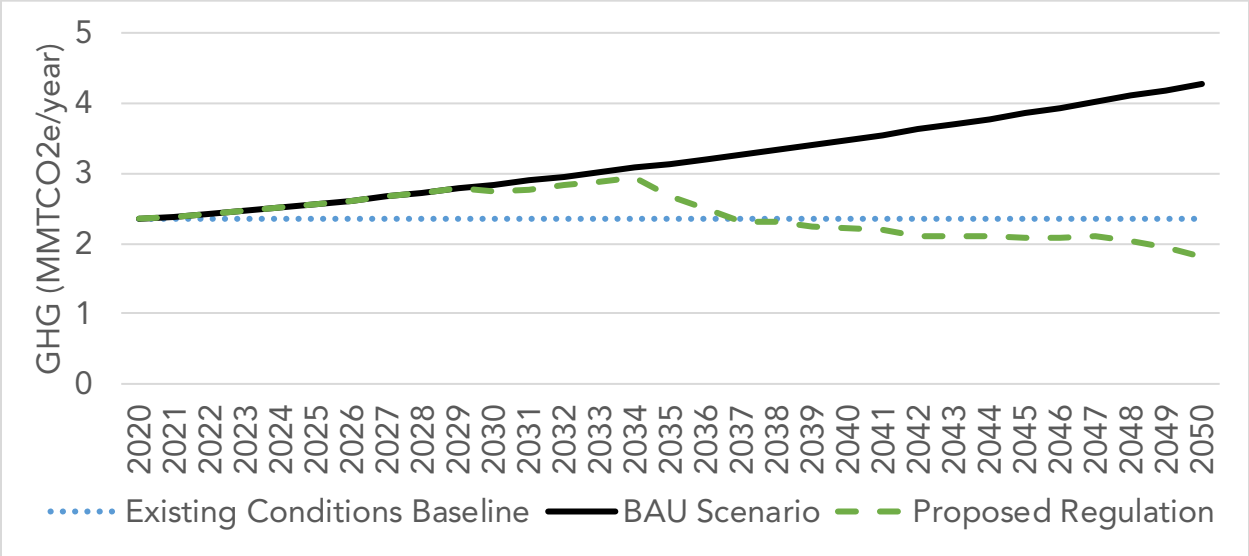
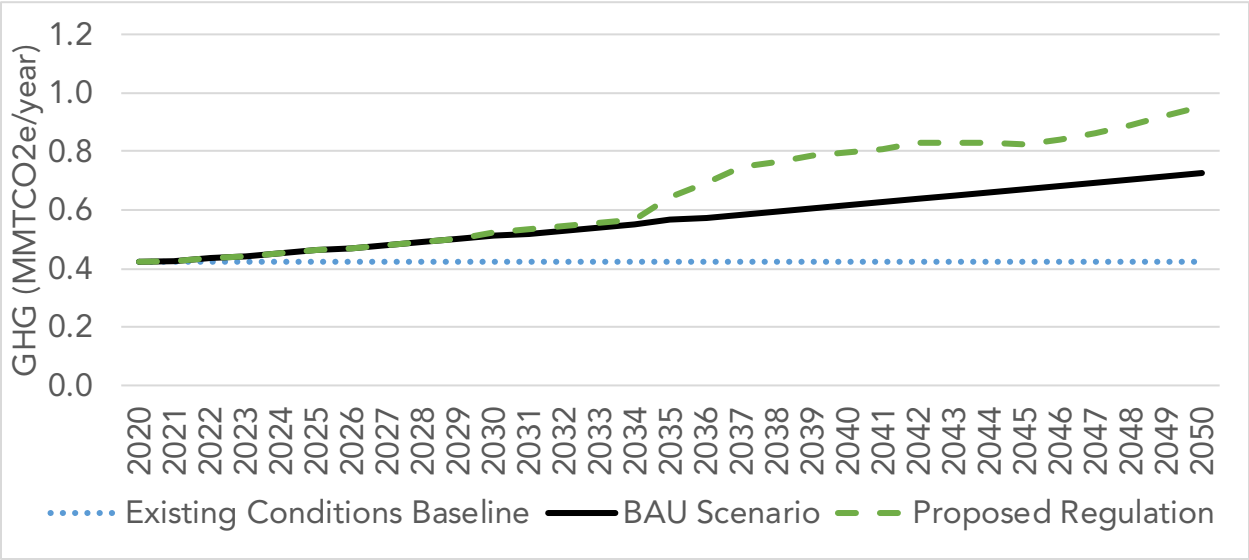


Figure 8: Projected Annual Well-to-Tank GHG Emissions from Locomotives Operating in California Compared to Existing Conditions Baseline (2020) and Without the Proposed Regulation (BAU Scenario)



Increased demand for lithium-ion based batteries could increase the need for manufacturing, refurbishing, and recycling facilities domestically and abroad, which may require modifications to or construction of new facilities. Increased use of lithium batteries could also increase lithium mining and exports from countries with raw mineral supplies. Some lithium demand may be met domestically.

It is possible that compliance responses may contribute at some level to demand for fuel cells, which could result in platinum mining and exports from source countries or other states and increased recycling, refurbishment, or disposal of hydrogen fuel cells. The movement of lithium and platinum domestically and worldwide would generate GHG emissions from vehicle and vessel movement that ship and distribute resources to global manufacturing facilities. Additionally, the mining of these resources would require the use of heavy equipment, which would likely be powered by diesel fuel, the combustion of which would produce GHG emissions. However, these materials would ultimately offset the emissions associated with combustion of gasoline, diesel, and other fossil fuels, reducing associated emissions.

As discussed under Impact 3-2, "Long-Term Operation-Related Impacts on Air Quality," of this Draft EA, the electrical demand generated by the use of ZE locomotives is anticipated to be supplied by public utility companies. California's electrical grid is anticipated to become increasingly cleaner by using more renewable energy over the coming years to comply with the targets mandated by the RPS. Additionally, hydrogen production is anticipated to become cleaner with renewable energy production. Production of energy for battery-electric and hydrogen ZE Locomotives would lead to an increase in GHG emissions. However, the demand for diesel fuel and diesel fuel production may lead to an overall long-term reduction

in GHG emissions. Implementation of the Proposed Regulation is anticipated to minimize emissions associated with operation of locomotives and would assist the State in meeting GHG reduction goals. Therefore, long-term operation-related GHG impacts associated with implementation of the Proposed Regulation would be **beneficial.**

9. Hazards and Hazardous Materials

Impact 9-1: Short-Term Construction-Related Impacts on Hazards and Hazardous Materials

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[75] and Indiana locations,[76] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

Production of new or retrofitting existing locomotives is expected to occur primarily at existing locomotive manufacturing facilities outside of California. Manufacturing or retrofitting would primarily be accomplished using heavy-duty equipment currently used at existing manufacturing facilities that would not appreciably change the risk of hazards and

[75] Ibid., pp.24
[76] Ibid., pp.24

hazardous materials impacts. Therefore, short-term construction-related hazardous impacts from production of new locomotives or locomotive engine replacement would be less than significant.

The Proposed Regulation could require the construction of a variety of facilities which could potentially require ground-disturbing activities, such as excavation, grading, and site preparation. While many locomotive manufacturing facilities would likely be sited outside of California, similar to existing locomotive manufacturing facilities, project construction within the state could involve manufacture, recycling, and refurbishment of batteries and hydrogen fuel cells, hydrogen generation facilities, and new electrical generation, transmission, charging, and wayside power infrastructure. However, there is uncertainty as to the exact location of new facilities and infrastructure. As a result, there is uncertainty as to the presence of hazardous materials at future project sites. Furthermore, it is not known what kinds of modifications to existing facilities would occur and whether any ground disturbance would be needed. Nonetheless, it is probable that construction activities for new facilities would require disturbance of undeveloped areas or potentially encounter contamination and hazardous materials from past activities at existing industrial sites.

Construction activities associated with the Proposed Regulation may require the transport, use, and disposal of hazardous materials. Construction activities generally use heavy-duty equipment requiring periodic refueling and lubricating fluids. 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 involves the use of a service vehicle that travels to the location of the construction equipment, and 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 of, and such spills are typically minor and localized to the immediate area of the fueling (or maintenance), the potential remains for a substantial release of hazardous materials into the environment.

For the reasons described above, short-term construction-related hazard and hazardous materials impacts associated with the Proposed Regulation could be potentially significant.

Mitigation Measure 9-1

The regulatory setting in Attachment A includes applicable laws, regulations, and policies related to hazards and hazardous materials. CARB does not have the authority to require implementation of mitigation related to new or modified facilities or infrastructure that would be approved by State or local jurisdictions or jurisdictions outside of California. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California could qualify as a "project" under CEQA and be subject to CEQA review. The jurisdiction with primary approval authority over a proposed project is the lead agency, which is required to review the proposed project for compliance with CEQA statutes. To the extent new or modified facilities in California are subject to CEQA, 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 the following:

- Proponents of new or modified facilities or infrastructure constructed as a result of reasonably foreseeable compliance responses to the Proposed Regulation would coordinate with State or local land use agencies to seek entitlements for development and meet all necessary environmental review requirements (e.g., those under CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.
- Based on the results of the environmental review, proponents would implement all feasible mitigation identified in the environmental document to reduce or substantially lessen the significant environmental impacts of the project on hazards and hazardous materials. Any mitigation specifically required for a new or modified facility or infrastructure would be determined by the State or local lead agency. However, future environmental documents prepared by State or local lead agencies could include the following mitigation measures:
    - Handling of potentially hazardous materials/wastes should be performed by or under the direction of a licensed professional with the necessary experience and knowledge to oversee the proper identification, characterization, handling and disposal or recycling of the materials generated as a result of the project. As wastes are generated, they should 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 occur in areas away from sensitive receptors, such as schools or residential areas. These areas should be secured with chain-link fencing or a similar barrier with controlled access to restrict casual contact from nonproject personnel. All project personnel who may encounter potentially hazardous materials/wastes should 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 State or local land use and/or permitting agencies for individual projects, CARB finds it legally infeasible to implement and enforce this measure. Moreover, because of the programmatic analysis of this EA, which does not contain project-specific details of potential impacts and associated mitigation, there is inherent uncertainty regarding the degree of mitigation that lead agencies may ultimately implement to reduce the potentially significant impacts if they approve these potential projects.

Consequently, while impacts would likely be reduced to a less-than-significant level with mitigation measures imposed by the land use and/or permitting agencies acting as lead agencies for these individual projects under CEQA, it cannot be determined with certainty that impacts would be reduced to less than significant given that the authority to require these measures is within the responsibility and jurisdiction of another agency and not CARB. Therefore, this Draft EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that if and when a project applicant seeks a permit for a compliance-response-related project, short-term construction-related impacts on hazards and hazardous materials associated with the Proposed Regulation could remain **potentially significant and unavoidable**.

Impact 9-2: Long-Term Operation-Related Impacts on Hazards and Hazardous Materials

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[77] and Indiana locations,[78] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

[77] Ibid., pp.24
[78] Ibid., pp.24

Operation of electric wayside power and locomotive charging infrastructure under the Proposed Regulation could use potentially hazardous equipment, such as electrical cables and high-voltage systems. Additionally, the long-term operation of locomotives and facilities associated with ZE technology would result in the routine transport, use, and disposal of hazardous materials (i.e., lithium-ion batteries, fuel cells, hydrogen fuels). Harmful substances can enter the environment in several ways throughout the entire cycle of fuel production, manufacturing, transportation, storage, distribution, and usage.

Increased use of ZE technology in locomotives could require the use of lithium-ion storage batteries or hydrogen fuel cells to provide alternative or additional electricity to locomotives with large electrical loads. An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and exports from source countries or other states, as well as an increase in use of facilities that manufacture, recycle, refurbish, and dispose of batteries and hydrogen fuel cells. Hazardous materials are used and created during operations of such facilities. For example, smelting is used to recycle batteries and creates hazardous emissions, although those are generally treated. Chemical leaching processes use chemicals such as hydrochloric acid and sulfuric acid.[79] These activities would be more likely to occur indoors in a contained area and with proper equipment, limiting the potential effects of spills and accidents as activities involving the use of hazardous materials would occur within the confines of facilities. Risk of outdoor release of hazardous materials would be highest during the movement of raw goods to manufacturing facilities or the export of finished goods containing hazardous materials following the manufacturing process. The transport, use, and disposal of hazardous materials would be required to comply with all applicable federal, State, and local laws that would reduce the potential for accidents and require certain actions should a spill or release occur; however, the potential remains for the release of hazardous materials into the environment.

Selective Catalytic Reduction (SCR) may be used on-board in some Tier 4 engines to reduce NO_X. Ammonia or urea is necessary for the chemical reactions in SCR. Use of SCR for NO_X reductions requires storage of liquid urea that is converted to ammonia only after it is injected into the SCR system to react and reduce NO_X emissions. Urea is less expensive and less hazardous than gaseous ammonia, so almost all SCR systems use urea. In addition, most of the ammonia formed during the SCR reaction process is consumed during the process. Therefore, there are limited risks associated with the use and handling of urea. Although some of the ammonia would not react and would be emitted in the exhaust, it is not anticipated to pose a significant adverse health risk. Urea is not a hazardous material, and its transport, use, and storage are not covered by federal or California regulations that address the transport of hazardous materials.

In the unlikely event that ammonia is used in place of urea, there could be some environmental impacts. Ammonia is on the U.S. EPA's list of extremely hazardous substances

[79] Jacoby, Mitch, It's Time to Get Serious About Recycling Lithium-Ion Batteries, July 14, 2019, accessed August 8, 2022. (weblink: https://cen.acs.org/materials/energy-storage/time-serious-recycling-lithium/97/i28).

under Title III, Section 302 of the Superfund Amendments and Reauthorization Act of 1986. Exposure to ammonia causes eye, nose, and throat irritation, and it will burn the skin. However, the risks associated with the use and handling of ammonia would be limited since the majority of ammonia formed would be consumed in the SCR reaction process. Although some of the ammonia would not react and would be emitted in the SCR exhaust, it is not anticipated to pose a significant adverse health risk.

Additionally, many SCR catalyst materials contain heavy metal oxides that are hazardous to human health. The catalyst vanadium pentoxide, for example, is on the U.S. EPA's Extremely Hazardous Substances List. In California, spent catalyst from an SCR system is considered hazardous waste.

Implementation of the Proposed Regulation could also result in an increase in demand for lithium mining. Lithium is currently sourced in two ways: from hard rock and from the evaporation of salt brines. Lithium from rock sources is primarily produced from spodumene, a lithium/aluminum/silicate mineral. Salt brine sources include salt lakes, which are currently the main source of lithium, and geothermal brines and salt brines associated with oil deposits. Lithium is the lightest solid metal. It can be absorbed into the body by inhalation of its aerosol and by ingestion and is corrosive to the eyes, the skin, and the respiratory tract. Lithium reacts violently with strong oxidants, acids, and many compounds (hydrocarbons, halogens, halons, concrete, sand, and asbestos), creating a fire and explosion hazard. In addition, lithium reacts with water, forming highly flammable hydrogen gas and corrosive fumes of lithium hydroxide. Lithium hydroxide represents a potentially substantial environmental hazard, particularly to water organisms. Implementation of the Proposed Regulation may also increase demand for platinum mining. Platinum mining can expose workers to excessive dust that can result in respiratory ailments.[80]

Lithium metal batteries contain potentially toxic metals, such as copper and nickel, and organic chemicals, like toxic and flammable electrolytes.[81] Improper management of lithium-ion batteries could pose an environmental hazard and be of concern to public safety. There have been some cases with consumer products containing lithium-ion batteries catching fire after or during transportation to disposal facilities. Once ignited, the resulting fires can be especially difficult to extinguish as temperatures can rapidly increase to up to 500 degrees Celsius (932 degrees Fahrenheit) as a result of interactions between a battery's cathodes and anodes, and water is an ineffective extinguisher.[82] The likelihood to overheat or ignite is increased if the batteries are poorly packaged, damaged, or exposed to a fire or other heat source. However, when packaged and handled properly, lithium batteries pose no

[80] Sepadi et al., Platinum Mine Workers' Exposure to Dust Particles Emitted at Mine Waste Rock Crusher Plants in Limpopo, South Africa, 2020. (weblink: *https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7014327/*).
[81] Zeng et al., Solving Spent Lithium-Ion Battery Problems in China: Opportunities and Challenges, Renewable and Sustainable Energy Reviews, 52, pp.1759-1767, 2015.
[82] Battery University, BU-304a: Safety Concerns with Li-Ion, updated February 22, 2022, accessed August 8, 2022. (weblink: *https://batteryuniversity.com/article/bu-304a-safety-concerns-with-li-ion*).

environmental hazard (79 Fed. Reg. 46011, 46032); therefore, no increased demand on public services related to emergency responders is anticipated. Further, these impacts are largely associated with the use and production of lithium-ion batteries used in consumer products as compared to lithium-ion storage batteries.

There are also inherent risks associated with the installation and use of hydrogen fuel cells, including fire and explosion, electric shock, and exposure to toxic materials. Hydrogen possesses several hazardous properties, such as a very wide flammability range, very low ignition energy, low viscosity, and high diffusivity, and it is chemically lighter than air.[83] However, fuel cell manufacturers developed and extensively safety-tested carbon-fiber hydrogen tanks, which can withstand environmental and human-made damage, including crash testing and ballistics. Hydrogen tanks are designed with multiple safety enhancements to prevent leaks in both routine use and extreme circumstances. Should a leak and subsequent ignition happen, the low radiant heat of a hydrogen fire and high diffusivity of hydrogen would reduce any potential damage, especially when compared to a gasoline fire.

The design of lithium-ion batteries and hydrogen fuel cells and compliance with regulations are sufficient to reduce adverse impacts associated with hazards and hazardous materials. An increase in demand for lithium-ion batteries and fuel cells could result in increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. However, any increased rates of disposal of lithium batteries and hydrogen fuel cells would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. Compliance with the appropriate federal and State laws governing the handling of potentially hazardous materials would be sufficient to minimize the risks from lithium-ion batteries and fuel cells because they ensure adequate handling and disposal safeguards to address these risks.

For the reasons described above, long-term operation-related impacts on hazards and hazardous materials associated with the Proposed Regulation could be potentially significant.

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

Because the authority to determine project-level impacts and require project-level mitigation lies with local land use and/or permitting agencies for individual projects, CARB finds it legally infeasible to implement and enforce this measure. Moreover, because of the programmatic analysis of this EA, which does not allow project-specific details of potential impacts and associated mitigation, there is inherent uncertainty regarding the degree of mitigation that may ultimately by implemented to reduce potentially significant impacts if it approves these potential projects.

Consequently, while impacts could be reduced to a less-than-significant level with mitigation measures imposed by the land use and/or permitting agencies acting as lead agencies for

[83] Health and Safety Executive, Fuel Cells: Understand the Hazards, Control the Risks, 2004.

these individual projects under CEQA, if and when a project applicant seeks a permit for a compliance-response-related project, this Draft EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potential long-term operation-related impacts regarding hazards and hazardous materials associated with the Proposed Regulation could be **potentially significant and unavoidable**.

10. Hydrology and Water Quality

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

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[84] and Indiana locations,[85] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

Implementation of the Proposed Regulation could result in production of new locomotives and modifications to existing locomotives to accommodate battery power and hydrogen fuel cell capabilities. Locomotive manufacturing generally occurs in an industrial environment and would be subject to applicable laws and regulations aimed at reducing impacts on water

[84] Ibid., pp.24
[85] Ibid., pp.24

quality from industrial activities. Activities associated with modifying existing locomotives to accommodate battery power and hydrogen fuel cell capabilities would likewise occur on the locomotives and would not result in ground disturbance or any impacts on hydrology. Locomotive modifications for the Proposed Regulation could require the use of electrical equipment, which would not have the potential to leak toxicants to water systems.

The Proposed Regulation could result in the construction of a variety of facilities that could affect existing hydrology and water quality conditions. While many locomotive manufacturing facilities would likely be sited outside of California, similar to existing locomotive manufacturing facilities, project construction within the state could involve manufacture, recycling, and refurbishment of batteries and hydrogen fuel cells; hydrogen generation facilities; and new electrical generation, transmission, charging, and wayside power infrastructure. However, there is uncertainty as to the exact location of new facilities and infrastructure. As a result, there is uncertainty as to the existing hydrologic conditions and the potential effects thereupon. Furthermore, it is not known what kinds of modifications to existing facilities would occur and whether any ground disturbance would be needed. These facilities could be located in areas with a range of hydrologic conditions. For example, some places may be vulnerable to flooding and mudflow. Construction of ZE infrastructure and other facilities may exacerbate hydrologic hazards because grading and excavation may alter drainage in a way that would increase potential flood risk on and around the project site. Grading and vegetation removal could also increase erosion, which could result in sedimentation in nearby waterways. Site leveling may also require fill of regulated water bodies. Precise impacts cannot be determined because specific construction details, siting locations, and associated hydrology and water quality conditions are not known at this time.

Construction activities could require disturbance of undeveloped areas, such as clearing of vegetation; earth movement and grading; trenching for utility lines; erection of new buildings; and paving of parking lots, delivery areas, and roadways. Specific construction projects would be required to comply with applicable erosion measures, water quality standards, and waste discharge requirements (e.g., NPDES, stormwater pollution prevention plan [SWPPP]). With respect to depleted groundwater supply, impaired water quality, and polluted runoff issues, because of the nature of associated activities, construction of new facilities or infrastructure would not be anticipated to result in substantial groundwater demands, water quality, or runoff. Depending on the location of construction activities, there could be adverse effects on drainage patterns and exposure of people or structures to areas susceptible to flood, seiche, tsunami, or mudflow.

Therefore, short-term construction-related impacts on hydrology and water quality associated with the Proposed Regulation could be potentially significant.

Mitigation Measure 10-1

The regulatory setting in Attachment A includes applicable laws, regulations, and policies that relate to hydrology and water quality. CARB does not have the authority to require implementation of mitigation related to new or modified facilities or infrastructure that would

be approved by State or local jurisdictions or jurisdictions outside of California. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California could qualify as a "project" under CEQA and be subject to CEQA review. The jurisdiction with primary approval authority over a proposed project is the lead agency, which is required to review the proposed project for compliance with CEQA statutes. To the extent new or modified facilities in California are subject to CEQA, 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 the following:

- Proponents of new or modified facilities or infrastructure constructed as a result of reasonably foreseeable compliance responses to the Proposed Regulation would coordinate with State or local land use agencies to seek entitlements for development and meet all necessary environmental review requirements (e.g., those under CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.
- Based on the results of the environmental review, proponents would implement all feasible mitigation identified in the environmental document to reduce or substantially lessen the significant environmental impacts of the project on hydrology and water quality. Any mitigation specifically required for a new or modified facility or infrastructure would be determined by the State or local lead agency. However, future environmental documents prepared by State or local lead agencies could include the following mitigation measures:
    - Implement best management practices (BMPs) to reduce sedimentation and pollution of surface waters, such as installation of silt fencing around the perimeter of active construction areas.
    - Train construction workers regarding the proper response to hazardous materials spills, as well as their responsibility for maintaining BMPs on-site.
    - Design runoff drainage plans to contain adequate capacity for projected flows on-site.
    - Avoid filling waters of the United States and waters of the State to the extent feasible. If activities require a waste discharge requirement or Section 401 Water Quality Certification, comply with all avoidance, reduction, and compensatory measures.

Because the authority to determine project-level impacts and require project-level mitigation lies with State or local land use and/or permitting agencies for individual projects, CARB finds it legally infeasible to implement and enforce this measure. Moreover, because of the programmatic analysis of this EA, which does not contain project-specific details of potential impacts and associated mitigation, there is inherent uncertainty regarding the degree of

mitigation that lead agencies may ultimately implement to reduce the potentially significant impacts if they approve these potential projects.

Consequently, while impacts would likely be reduced to a less-than-significant level with mitigation measures imposed by the land use and/or permitting agencies acting as lead agencies for these individual projects under CEQA, it cannot be determined with certainty that impacts would be reduced to less than significant given that the authority to require these measures is within the responsibility and jurisdiction of another agency and not CARB. Therefore, this Draft EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that if and when a project applicant seeks a permit for a compliance-response-related project, short-term construction-related impacts on hydrology and water quality associated with the Proposed Regulation could remain **potentially significant and unavoidable**.

Impact 10-2: Long-Term Operation-Related Impacts on Hydrology and Water Quality

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[86] and Indiana locations,[87] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure

[86] Ibid., pp.24
[87] Ibid., pp.24

(e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

Operation of facilities to support locomotive manufacturing, battery production, and production and distribution of hydrogen fuel cells would be required to comply with applicable erosion measures, water quality standards, and waste discharge requirements (e.g., NPDES, SWPPP). Operation of these facilities would not require ground disturbance in addition to that performed during construction. With respect to depleting groundwater supplies, because of the nature of associated activities, new facilities are not anticipated to result in substantial demands.

Under the Proposed Regulation, the demand for oil and gas extraction activities could decrease. Oil and gas extraction can produce substantial adverse effects on hydrology. For instance, fracking requires the use of millions of liters of water and consequently generates millions of liters of wastewater, which can contaminate groundwater with toxic chemical compounds.[88] As of June 2015, U.S. EPA had identified 1,173 known chemicals used in the fracking industry. Additionally, accidental release of oil or gas and related wastewater (e.g., spills from pipelines or trucks, leakage from wastewater ponds or tanks) can introduce toxicants, radionuclides, and dissolved metals and affect the salinity of local drinking water supplies.[89] Through implementation of the Proposed Regulation, the aforementioned effects on hydrologic resources and water quality would be reduced as ZE locomotives displace internal combustion engine-powered locomotives. As a result, adverse hydrologic and water quality effects associated with oil and gas extraction could be decreased through implementation of the Proposed Regulation.

An increased demand for lithium-ion batteries would result in an increase in the demand for mined lithium. Mining of hard rock would require the use of conventional mining practices, including the creation of underground mines and open pits, which would result in the removal of organic material (e.g., bedrock, vegetation). Additionally, lithium can be collected from continental brines found in basins. Salty groundwater is pumped into lagoons where it undergoes evaporation, producing salts containing lithium compounds. This process could result in groundwater overdraft, as well as impacts on surface water should the concentrated water spill into adjacent areas. Because of its high reactivity, lithium is found bound to other elements. To process brine, toxic chemicals must be used that can cause water pollution through leaching and spills. Further, lithium mining from continental brines is a

[88] European Parliament, Impact of Shale Gas and Shale Oil Extraction on the Environment and on Human Health, 2012. (weblink: *https://www.europarl.europa.eu/document/activities/cont/201312/20131205ATT75545/20131205ATT75545EN.pdf*).

[89] Environmental Health Perspectives, Salting the Earth: The Environmental Impact of Oil and Gas Wastewater Spills, December 2016. (weblink: *https://ehp.niehs.nih.gov/doi/epdf/10.1289/ehp.124-A230*).

water-intensive process that, as mining typically occurs in arid landscapes, could result in the depletion of available water resources.[90]

Mineral extraction and mining activities within the United States would be required to comply with the provisions of the Clean Water Act and the natural resource protection and land reclamation requirements of the appropriate State and federal land managers. For instance, the U.S. Bureau of Land Management and U.S. Forest Service mining permit conditions contain protections for hydrologic resources and require mining reclamation standards. However, lithium and platinum are also obtained from areas outside of the United States, where State and U.S. federal laws and regulations are not applicable. Thus, water quality impacts related to mining could occur because of implementation of the reasonably foreseeable compliance responses associated with the Proposed Regulation.

As discussed under Impact 9-2, "Long-Term Operation-Related Impacts on Hazards and Hazardous Materials," fuel production, manufacturing, transportation, storage, distribution, and usage may also result in the accidental release of harmful substances into the environment, which could adversely affect water quality if spilled in aquatic systems.

Therefore, the long-term operation-related impacts on hydrology and water quality associated with the Proposed Regulation could be potentially significant.

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

Because the authority to determine project-level impacts and require project-level mitigation lies with State or local land use and/or permitting agencies for individual projects, CARB finds it legally infeasible to implement and enforce this measure. Moreover, because of the programmatic analysis of this EA, which does not contain project-specific details of potential impacts and associated mitigation, there is inherent uncertainty regarding the degree of mitigation that lead agencies may ultimately implement to reduce the potentially significant impacts if they approve these potential projects.

Consequently, while impacts would likely be reduced to a less-than-significant level with mitigation measures imposed by the land use and/or permitting agencies acting as lead agencies for these individual projects under CEQA, it cannot be determined with certainty that impacts would be reduced to less than significant given that the authority to require these measures is within the responsibility and jurisdiction of another agency and not CARB. Therefore, this Draft EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that if and when a project applicant seeks a permit for a compliance-response-related project, long-term operation-related impacts on hydrology and water quality associated with the Proposed Regulation could remain **potentially significant and unavoidable**.

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[90] Friends of the Earth, Lithium, 2013. (weblink: https://www.foeeurope.org/sites/default/files/publications/13_factsheet-lithium-gb.pdf).

11. Land Use and Planning

Impact 11-1: Short-Term Construction-Related and Long-Term Operation-Related Impacts on Land Use and Planning

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[91] and Indiana locations,[92] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

A conflict with a land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect is not on its own considered an impact on the environment. Rather, a land use impact occurs when such a conflict causes a significant impact on the environment.

The Proposed Regulation could result in the construction of a variety of facilities. While many locomotive manufacturing facilities would likely be sited outside of California, similar to existing locomotive manufacturing facilities, project construction within the state could involve manufacture, recycling, and refurbishment of batteries and hydrogen fuel cells;

[91] Ibid., pp.24
[92] Ibid., pp.24

hydrogen generation facilities; and new electrical generation, transmission, charging, and wayside power infrastructure. These new or modified facilities would likely be located in existing footprints, within areas with consistent zoning (i.e., industrial, light industrial, or heavy industrial), or would undergo the appropriate process per the requirements by the local jurisdictions for a variance or conditional use through the local jurisdiction of subsequent project sites. Construction and operation of new or expanded facilities could occur and may require the conversion of nonindustrial land uses to industrial land uses. These impacts would also be subject to zoning and land use regulations of the appropriate local jurisdictions and regulations and may be within the purview of natural resource agencies other than CARB. Project areas under the purview of existing land use plans, zoning codes, or other regulatory requirements of other agencies are not likely to place industrial land uses among incompatible or sensitive land uses, such as residential uses.

Compliance responses could result in environmental impacts, as discussed throughout this EA, that might conflict with a land use policy, warranting additional actions that in turn might result in environmental impacts. For example, new facilities and infrastructure might result in impacts on habitat, in conflict with a local general plan policy protecting that habitat and requiring restoration of temporarily disturbed habitat. Habitat restoration can result in emissions of criteria air pollutants if, for example, heavy equipment is needed to recontour areas. Emissions of criteria air pollutants would be considered an environmental impact. However, as stated, it is anticipated that most compliance responses would be in areas already zoned or designated for such uses, reducing the potential for conflicts with plans and resultant environmental impacts. Additionally, projects are often designed to comply with applicable plans in anticipation of environmental review. Therefore, the Proposed Regulation is not anticipated to result in a significant environmental impact related to a conflict with land use plans, policies, or regulations designed to avoid or mitigate an environmental effect. Additionally, because compliance responses identified for the Proposed Regulation would tend to be located in industrial areas rather than residential areas, they would not divide an existing, established community.

Potential environmental effects associated with land use changes to accommodate compliance responses, which would occur regardless of conflicts with adopted land use policies, plans, and regulations, are discussed in further detail in their respective impact discussions. These include impacts on agriculture and forestry resources, biological resources, geology and soils, and hydrology and water quality.

Therefore, implementation of the Proposed Regulation is not anticipated to divide an established community or conflict with a land use plan, policy, or regulation. Land use and planning impacts would be **less than significant**.

12. Mineral Resources

Impact 12-1: Short-Term Construction-Related and Long-Term Operation-Related Impacts on Mineral Resources

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[93] and Indiana locations,[94] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

Locomotive production would occur largely at existing manufacturing facilities. However, the increased production could require the expansion of existing facilities or construction of new facilities. These facilities are often located within industrial areas. It is not anticipated that mineral resources of economic significance would be present or recoverable at existing manufacturing facility, nor would an existing manufacturing facility be a designated mineral resource recovery site. Implementation of the Proposed Regulation could also require construction and operation of substantial new and improved infrastructure (e.g., electric charging and wayside power) to support the use of electric locomotives and hydrogen fuel cell-powered locomotives. To support the use of new ZE technologies, it is reasonably

[93] Ibid., pp.24
[94] Ibid., pp.24

foreseeable that activities associated with new or modified facilities for lithium battery and fuel cell recycling and refurbishment could occur. Additionally, to meet increased demand for hydrogen fuel, new hydrogen generation plants would need to be constructed. Construction and operation of new and modified infrastructure could occur in areas that might have mineral resources, but it is more likely they would be located in areas zoned appropriately for such industrial uses rather than in areas with recoverable mineral resources that are zoned for mineral recovery. Similarly, these facilities are also more likely to be in already disturbed areas that are not conducive to mineral recovery (e.g., charging stations would be in areas already used by locomotives for maintenance activities). Therefore, it is not expected that these activities would impede recovery of mineral resources.

Increased use of locomotives with ZE technologies to comply with the Proposed Regulation may require the use lithium-ion storage batteries or fuel cells to provide electricity to locomotives. An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and exports from source countries or other states. Depending on the magnitude of required materials, implementation of the Proposed Regulation could affect the availability of known materials because it would involve mining lithium. Lithium consumption for batteries has increased substantially in recent years because of the increased demand for rechargeable lithium batteries, which use approximately 71 percent of the world's lithium resources. As of January 2020, the only domestic lithium mine in operation in the United States is a brine operation in Nevada. Two companies produced a large array of downstream lithium compounds in the United States from domestic or South American lithium carbonate, lithium chloride, and lithium hydroxide. From 2016 through 2019, the United States imported lithium from Argentina (55 percent), Chile (36 percent), China (5 percent), Russia (2 percent), and others (2 percent).[95] However, there are current initiatives at the State and federal level that are likely to influence lithium mining domestically, which includes efforts in California.

Efforts to address supply chains of mineral commodities have gained substantial interest from the State and federal government, both of which have sought to address mineral independence and security. Examples of efforts include California AB 1657 (Garcia), Chapter 271, 2020 (AB 1657), which requires the California Energy Commission to convene a Blue-Ribbon Commission on Lithium Extraction in California (Lithium Valley Commission). The Lithium Valley Commission is charged with reviewing, investigating, and analyzing issues and potential incentives regarding lithium extraction and use in California.

At the federal level, Executive Order (EO) 14017 (86 *Federal Register* 11849, February 24, 2021) directed federal agencies to perform a 100-day review of "supply chain risks" for four classes of products: semiconductors, high-capacity batteries (including for electric vehicles),

[95] U.S. Geological Survey, Mineral Commodity Summaries, 2022. (weblink: https://pubs.usgs.gov/periodicals/mcs2022/mcs2022.pdf).

critical and strategic minerals (including rare earths), and pharmaceuticals.[96] The EO additionally directs agencies to perform year-long reviews of supply chains in six critical sectors, which include transportation and energy. The reviews will seek to identify supply chain risks that leave the United States vulnerable to reductions in the availability and integrity of critical goods, products, and services and will include policy recommendations for address such risks. The EO indicates that, among other approaches, the current administration will explore how trade policies and agreements can be used to strengthen the resilience of U.S. supply chains.

In summary, while substantial research has been done and there is a clear commitment to increasing the domestic supply of lithium, exact actions that will be taken in response to this goal of increasing the domestic supply of lithium are yet to be identified. While lithium-ion batteries are not reliant on the use of the metal cobalt, other consumer products, such as laptops, cell phones, and other electronics, use cobalt as a battery component. Cobalt is comparatively rarer than lithium. As a result, demand for batteries containing lithium-ion cobalt has increased in recent years, and the rate of recycling lithium constituents has also increased.

Additionally, an increased demand for hydrogen fuel cell-powered locomotives and a related increase in demand for mining of platinum-group metals (PGMs) could occur. The leading domestic use for PGMs is in catalytic converters to decrease harmful emissions from automobiles. PGMs are also used in catalysts for bulk-chemical production and petroleum refining; dental and medical devices; electronic applications, such as in computer hard disks, hybridized integrated circuits, and multilayer ceramic capacitors; glass manufacturing; investment; jewelry; and laboratory equipment.[97] The United States has some platinum production and reserves, and internationally South Africa has the highest volume of platinum production and reserves.[98] From 2016 through 2019, the United States imported platinum from South Africa (43 percent), Germany (21 percent), Italy (7 percent), Switzerland (6 percent), and other countries (23 percent). During the same period, the United States imported palladium from Russia (38 percent), South Africa (33 percent), Germany (8 percent), the United Kingdom (5 percent), and other countries (16 percent).[99]

Appendix G of the CEQA Guidelines considers an impact on mineral resources to be the loss of availability of a known mineral resource that would be of value to a local entity, a region, or the state. This type of impact could result from actions such as building a structure over an area that contains mineral resources, thereby prohibiting access to mining activities. As

[96] 86 FR 11849, EO 14017, America's Supply Chains, February 24, 2021. (weblink: https://www.govinfo.gov/content/pkg/FR-2021-03-01/pdf/2021-04280.pdf).
[97] U.S. Geological Survey. Platinum-Group Metals, accessed August 8, 2022. (weblink: https://www.usgs.gov/centers/national-minerals-information-center/platinum-group-metals-statistics-and-information).
[98] Ibid.
[99] Ibid.

discussed above, buildings developed in response to implementation of the Proposed Regulation would likely be located in areas within existing footprints or in areas with consistent zoning where original permitting and analyses considered these issues. Implementation of the Proposed Regulation and associated compliance responses could result in increased mining for lithium and PGMs but would not affect the economic potential related to known mineral resources. However, because the Proposed Regulation may increase lithium mining, it would contribute to the loss of availability of lithium as it is mined and consumed. Thus, short-term construction-related and long-term operation-related impacts on mineral resources associated with the Proposed Regulation could be potentially significant.

Mitigation Measure 12-1

The regulatory setting in Attachment A includes applicable laws and regulations that provide protection of mineral resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities or infrastructure that would be approved by State or local jurisdictions or jurisdictions outside of California. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California could qualify as a "project" under CEQA and be subject to CEQA review. The jurisdiction with primary approval authority over a proposed project is the lead agency, which is required to review the proposed project for compliance with CEQA statutes. To the extent new or modified facilities in California are subject to CEQA, 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 on mineral resources include the following:

- Proponents of new or modified facilities or infrastructure constructed as a result of reasonably foreseeable compliance responses to the Proposed Regulation would coordinate with State or local land use agencies to seek entitlements for development and meet all necessary environmental review requirements (e.g., those under CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.
- Based on the results of the environmental review, proponents would implement all feasible mitigation identified in the environmental document to reduce or substantially lessen the significant environmental impacts of the project on mineral resources. Any mitigation specifically required for a new or modified facility or infrastructure would be determined by the State or local lead agency. However, future environmental documents prepared by State or local lead agencies could include the following:
    - Prior to the issuance of any development permits, proponents of new or modified facilities or infrastructure constructed as a result of reasonably foreseeable compliance responses to the Proposed Regulation should

prepare an investigation/study, which would include an evaluation of the development's impact on the availability of mineral resources valuable to the region and residents of the state or delineated on a local general plan, specific plan, or other land use plan.

- Proponents of new or modified facilities or infrastructure constructed as a result of reasonably foreseeable compliance responses to the Proposed Regulation should provide a complete site plan showing any overlapping areas between the proposed plan and locally important mineral resources delineated on a local general plan, specific plan, or other land use plan. Proponents should avoid locating infrastructure that would result in the loss of availability of locally important mineral resources, as much as possible.

Because the authority to determine project-level impacts and require project-level mitigation lies with State or local land use and/or permitting agencies for individual projects, CARB finds it legally infeasible to implement and enforce this measure. Moreover, because of the programmatic analysis of this EA, which does not contain project-specific details of potential impacts and associated mitigation, there is inherent uncertainty regarding the degree of mitigation that lead agencies may ultimately implement to reduce the potentially significant impacts if they approve these potential projects.

Consequently, while impacts would likely be reduced to a less-than-significant level with mitigation measures imposed by the land use and/or permitting agencies acting as lead agencies for these individual projects under CEQA, it cannot be determined with certainty that impacts would be reduced to less than significant given that the authority to require these measures is within the responsibility and jurisdiction of another agency and not CARB. Therefore, this Draft EA takes the conservative approach in its postmitigation significance conclusion and discloses, for CEQA compliance purposes, that if and when a project applicant seeks a permit for a compliance-response-related project, short-term construction-related and long-term operation-related impacts on mineral resources associated with the Proposed Regulation could remain **potentially significant and unavoidable**.

13. Noise

Impact 13-1: Short-Term Construction Related Impacts on Noise

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at

their Pennsylvania, Texas,[100] and Indiana locations,[101] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

Implementation of the Proposed Regulation could result in construction of new manufacturing facilities to build new or modify existing locomotives. Additionally, construction of new hydrogen generation facilities, and infrastructure to support alternative fueling and/or wayside power would be needed to support implementation of the Proposed Regulation. An increase in demand for lithium-ion batteries and fuel cells could result in construction of and modification to electric facilities, as well as facilities that manufacture, recycle, and refurbish batteries and fuel cells. These activities, including earth moving, grading, demolition, and building construction, would require the use of heavy-duty equipment that would generate high volumes of short-term noise. Construction activities may occur during the day or night. The effects of construction noise would depend on the type of construction activities occurring on any given day, noise levels generated by those activities, distances to noise-sensitive receptors, and whether the equipment is mobile or stationary. Additionally, the perception of changes in noise would depend on the existing ambient noise environment, as 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. Use of heavy equipment would be consistent with the existing noise characteristics of typical construction activities within industrial areas. Moreover, it would be expected that manufacturing facilities and other supporting infrastructure for locomotive operations would not be located close to sensitive receptors.

[100] Ibid., pp.24
[101] Ibid., pp.24

According to the California Department of Transportation Technical Supplemental document, a doubling of sound energy (i.e., two sources of the same loudness each producing sound) would result in a 3-decibel (dB) increase in sound.[102] Also, a 3-dB increase in sound is considered to be barely perceptible to the normal person.[103] If the Proposed Regulation is not going to double the intensity of off-road construction equipment, the Proposed Regulation would not result in a noise increase during construction that would be perceptible to the nearest sensitive receptor.[104] Furthermore, industrial areas, railyards, and other locations where support facilities may be located generally do not support substantial numbers of sensitive land uses, such as residences, hospitals, day care facilities, and hotels. Therefore, construction of compliance response facilities would not likely produce adverse noise levels as compared to existing conditions.

During any construction project, the site preparation phase typically generates the most substantial noise levels because site preparation generally requires the largest and noisiest types of construction equipment. A detailed construction equipment list is not known for each project because no final specific engineering has been completed for any compliance responses in response to the Proposed Regulation. However, it is expected that the primary sources of noise, based on the anticipated compliance responses, would include backhoes, bulldozers, excavators, and cranes.

Noise levels from typical types of construction equipment can range from approximately 74 to 94 A-weighted decibels (dBA) at 50 feet. Based on this information and accounting for typical use characteristics of individual pieces of equipment and activity types, on-site construction could result in hourly average noise levels of 87 dBA equivalent level measurements (L_{eq}) at 50 feet and maximum noise levels of 90 dBA maximum sound level (L_{max}) at 50 feet from the simultaneous operation of heavy-duty equipment. Based on these and general attenuation rates, exterior noise levels at noise-sensitive receptors located within thousands of feet from project sites could exceed typical local noise standards (e.g., 50/60 dBA L_{eq}/L_{max} during daytime hours and 40/50 dBA L_{eq}/L_{max} during nighttime hours) and could be considered a substantial increase in ambient noise. Construction may also take place outside of hours allowed for by local jurisdictions.

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 to 109 vibration decibels (VdB) and from 0.003 to 0.089 inches per second (in/sec) peak particle velocity (PPV) at 25 feet. Based on this project type, it is expected that the primary sources of groundborne

[102] California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013, (weblink: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tens-sep2013-a11y.pdf).
[103] Ibid., pp.24
[104] Ibid., pp.24

vibration and noise would include bulldozers and trucks. According to the Federal Transit Administration (FTA), levels associated with the use of a large bulldozer and trucks are 0.089 and 0.076 in/sec PPV (87 and 86 VdB), respectively, at 25 feet. With respect to the prevention of structural damage in newer buildings, construction-related activities would not exceed FTA vibration damage criteria (e.g., 0.2 in/sec PPV for nonengineered timber and masonry buildings). 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.

Implementation of the Proposed Regulation could result in short-term construction noise levels in excess of applicable standards or that result in a substantial increase in ambient levels at nearby sensitive receptors, and exposure to excessive vibration levels. Therefore, short-term construction-related noise impacts (including vibration) associated with the Proposed Regulation could be potentially significant.

Mitigation Measure 13-1

The regulatory setting in Attachment A includes applicable laws, regulations, and policies related to noise and vibration. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with discretionary local land use and/or permitting authority. New or modified facilities in California could qualify as a "project" under CEQA and be subject to CEQA review. The jurisdiction with primary approval authority over a proposed project is the lead agency, which is required to review the proposed project for compliance with CEQA statutes. To the extent new or modified facilities in California are subject to CEQA, 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 noise- and vibration-related impacts include the following:

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

- Equip all emergency pressure relief valves and steam blow-down lines with silencers to limit noise levels.
- Contain facilities within buildings or other types of effective noise enclosures.
- Employ engineering controls, including sound-insulated equipment and control rooms, to reduce the average noise level in normal work areas.
- Ensure that noise-generating construction activities (including truck deliveries 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 that all project equipment has sound-control devices no less effective than those provided on the original equipment.
- Adequately muffle and maintain all construction equipment used.
- Ensure that all stationary construction equipment (e.g., 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 operation-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 backup alarms on mobile equipment.
- Install mufflers on air coolers and exhaust stacks of all diesel- and gas-driven engines.

Because the authority to determine project-level impacts and require project-level mitigation lies with local land use and/or permitting agencies for individual projects, CARB finds it legally infeasible to implement and enforce this measure. Moreover, because of the programmatic analysis of this EA, which does not allow project-specific details of potential impacts and associated mitigation, there is inherent uncertainty regarding the degree of mitigation that may ultimately by implemented to reduce potentially significant impacts if it approves these potential projects.

Consequently, while impacts could be reduced to a less-than-significant level with mitigation measures imposed by the land use and/or permitting agencies acting as lead agencies for these individual projects under CEQA, if and when a project applicant seeks a permit for a compliance-response-related project, this Draft EA takes the conservative approach in its postmitigation significance conclusion and discloses, for CEQA compliance purposes, that the potential short-term construction-related noise impacts (including vibration) associated with the Proposed Regulation could be **potentially significant and unavoidable**.

Impact 13-2: Long-Term Operation-Related Impacts on Noise

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[105] and Indiana locations,[106] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

Implementation of the Proposed Regulation could result in increased electrical and battery power usage, thereby eliminating combustion engine noise from locomotives. New sources of noise associated with implementation of Proposed Regulation could include operation of electrical infrastructure at railyards and other wayside locations along rail lines. Noise from operation of such equipment would not exacerbate noise impacts above existing noise levels. Increased mining could also occur; however, because of the nature of mining activities, such sites are usually isolated away from sensitive receptors in appropriately zoned areas. Therefore, it is unlikely that substantial numbers of receptors would be exposed to increased noise levels.

Additionally, implementation of the Proposed Regulation could result in the operation of hydrogen fuel-related infrastructure (e.g., pipelines, compressor stations, fueling stations,

[105] Ibid., pp.24
[106] Ibid., pp.24

trucking) outside the boundaries of a rail facility. Operation of these facilities could include on-site noise sources, including fuel-delivery and other hauling-related activities, fuel-handling and processing activities, and use of mechanical equipment. Depending on the proximity to existing noise-sensitive receptors, stationary source noise levels could exceed applicable noise standards and result in a substantial increase in ambient noise levels. Vibration may occur during maintenance activities that require jackhammering or use of heavy equipment, which could result in a substantial though likely short-term increase in vibration.

Therefore, long-term operation-related noise impacts (including vibration) associated with the Proposed Regulation could be potentially significant.

Mitigation Measure 13-2: Implement Mitigation Measure 13-1

Because the authority to determine project-level impacts and require project-level mitigation lies with local land use and/or permitting agencies for individual projects, CARB finds it legally infeasible to implement and enforce this measure. Moreover, because of the programmatic analysis of this EA, which does not allow project-specific details of potential impacts and associated mitigation, there is inherent uncertainty regarding the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts if potential projects are approved.

Consequently, while impacts could be reduced to a less-than-significant level with mitigation measures imposed by the land use and/or permitting agencies acting as lead agencies for these individual projects under CEQA, if and when a project applicant seeks a permit for a compliance-response-related project, this Draft EA takes the conservative approach in its postmitigation significance conclusion and discloses, for CEQA compliance purposes, that the potential long-term operation-related noise impacts (including vibration) associated with the Proposed Regulation could be **potentially significant and unavoidable**.

14. Population and Housing

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

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at

their Pennsylvania, Texas,[107] and Indiana locations,[108] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

Construction, modification, and maintenance activities occurring within locomotive manufacturing facilities would be expected to be served by workers currently serving them. Likewise, it is expected that new locomotive construction would be completed by businesses that conduct such activities already. The existing employment base at a locomotive manufacturing facility is expected to be sufficient to construct new locomotives and/or implement the necessary locomotive modifications to achieve compliance with the Proposed Regulation. It is conceivable that additional employment could be needed to execute such modifications; however, such a rise in employment opportunities would not be substantial enough to increase a community's population or require the construction of housing.

Additionally, ZE technology infrastructure constructed and maintained as a compliance response to the Proposed Regulation is anticipated to require relatively small crews, and demand for crews would be temporary and short term (e.g., 6 to 12 months per project). Therefore, a sufficient construction employment base would likely be available, and substantial construction worker migration would not be likely to occur.

Operation of new or modified infrastructure would generate varying levels of employment opportunities. The number of jobs produced would be directly related to the maintenance needs of infrastructure. There is inherent uncertainty surrounding the exact locations of any new infrastructure constructed as a result of the Proposed Regulation. For mining, it is likely that existing crews would be used because the increase in lithium and platinum mining is expected to occur at existing facilities. Similarly, other infrastructure is also likely to use

[107] Ibid., pp.24
[108] Ibid., pp.24

existing staff or only a limited number of new staff. Therefore, it is not anticipated that any additional housing would be required to implement the reasonably foreseeable compliance responses to the Proposed Regulation.

Further, it is unlikely that any new facilities would be constructed in areas with existing housing because of the nature of the facilities. That is, industrial facilities would be sited in areas zoned for these types of uses. Therefore, it is unlikely the Proposed Regulation would displace existing housing to accommodate new locomotive manufacturing facilities.

Any additional employment needed to support the compliance response to the Proposed Regulation would not be substantial enough to substantially increase a community's population, require the construction of housing, or displace housing. Impacts would be **less than significant**.

15. Public Services

Impact 15-1: Short-Term Construction-Related and Long-Term Operation-Related Impacts on Public Services

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[109] and Indiana locations,[110] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling,

[109] Ibid., pp.24
[110] Ibid., pp.24

refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

Construction and operation activities, as well as new or modified facilities or infrastructure, would likely occur within footprints of existing manufacturing facilities or in areas with appropriate zoning that permit such uses and activities. Generally, an increased need for public services is associated with a permanent growth in population. As discussed under Impact 14-1, the Proposed Regulation is not expected to result in an increase in employment opportunities that is great enough to substantially increase a community's population. Similarly, because locomotive manufacturing is expected to primarily take place at existing facilities, existing public services would be sufficient to serve these operations. While some new locomotive manufacturing facilities may be required, it is anticipated that any new facilities would be located in areas with similar industrial uses. Therefore, new manufacturing facilities would not represent a new use in any given area. Other activities, such as those for battery recycling, are expected to occur at existing facilities. As a result, short-term construction-related and long-term operation-related impacts on fire protection, police protection, schools, parks, and other facilities associated with the Proposed Regulation would be **less than significant**.

16. Recreation

Impact 16-1: Short-Term Construction-Related and Long-Term Operation-Related Impacts on Recreation

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[111] and Indiana locations,[112] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for

[111] Ibid., pp.24
[112] Ibid., pp.24

hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

Construction and operation activities, as well as new or modified facilities or infrastructure, would likely occur within footprints of existing manufacturing facilities or in areas with appropriate zoning that permit such uses and activities. Therefore, compliance responses would not displace any recreational facilities. Construction and operational activities associated with reasonably foreseeable compliance responses would not be anticipated to result in increased use of regional parks and other recreational facilities, such that existing neighborhood and regional parks or other recreational facilities would be substantially deteriorated. An increased need for recreational facilities and the accelerated degradation of existing recreational facilities typically are associated with permanent population growth. As discussed under Impact 14-1, the Proposed Regulation is not expected to result in an increase in employment opportunities that is great enough to substantially increase a community's population. Therefore, new or expanded recreational facilities would not be needed as a result of the Proposed Regulation, and existing facilities would not experience accelerated degradation. As a result, short-term construction-related and long-term operation-related impacts on recreational facilities associated with the Proposed Regulation would be **less than significant**.

17. Transportation

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

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at

their Pennsylvania, Texas,[113] and Indiana locations,[114] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

State CEQA Guidelines Section 15064.3(b) identifies criteria for analyzing the transportation impacts of a project, including land use projects (Section 15064.3[b][1]) and transportation projects (Section 15064.3[b][2]). Construction activities would be anticipated to require relatively small crews, and demand for these crews would be temporary (e.g., 6 to 12 months per project) and would not result in unplanned population growth. Therefore, while implementation of the Proposed Regulation may include development and operation of new facilities, short-term construction would not drive development of urban areas, residential development, major employment generation, or transportation projects. Thus, increased VMT from construction-related activities would not be substantial and would be short term.

The existing employment base is expected to be sufficient to implement the necessary locomotive manufacturing and/or modifications and ZE technologies to achieve compliance with the Proposed Regulation. It is conceivable that additional employment could be needed to execute such modifications; however, such a rise in employment opportunities would not be substantial enough to result in increased traffic that would result in hazards, conflict with local transportation policies, or impede emergency access.

Implementation of the Proposed Regulation could result in the construction of new or modified infrastructure, such as hydrogen production and fueling and electrical power and charging facilities. Construction of infrastructure could result in short-term construction traffic (primarily motorized) in the form of worker commute and material delivery trips. The amount of construction activity would fluctuate depending on the particular type, number, and

[113] Ibid., pp.24
[114] Ibid., pp.24

duration of use of equipment, as well as 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 facilities and construction, 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 related to project-generated heavy-duty truck trips.

Therefore, short-term construction-related impacts on transportation associated with the Proposed Regulation could be potentially significant.

Mitigation Measure 17-1

The regulatory setting in Attachment A includes applicable laws, regulations, and policies related to transportation. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with discretionary land use and/or permitting authority. New or modified facilities in California could qualify as a "project" under CEQA and be subject to CEQA review. The jurisdiction with primary approval authority over a proposed project is the lead agency, which is required to review the proposed project for compliance with CEQA statutes. To the extent new or modified facilities in California are subject to CEQA, 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 the following:

- Proponents of new or modified facilities constructed as a compliance response to the Proposed Regulation would coordinate with local land use agencies to seek entitlements for development and meet all necessary environmental review requirements (e.g., those under 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 to and egress from a proposed project site. Utilize flaggers where necessary to control traffic at site entrances during construction.
- Prepare a construction traffic control plan and a traffic management plan.
- Encourage carpooling to the site.

- Avoid materials deliveries during peak traffic periods.

Because the authority to determine project-level impacts and require project-level mitigation lies with local land use and/or permitting agencies for individual projects, CARB finds it legally infeasible to implement and enforce this measure. Moreover, because of the programmatic analysis of this EA, which does not allow project-specific details of potential impacts and associated mitigation, there is inherent uncertainty regarding the degree of mitigation that lead agencies may ultimately implement to reduce the potentially significant impacts if they approve these potential projects.

Consequently, while impacts could likely be reduced to a less-than-significant level with mitigation measures imposed by the land use and/or permitting agencies acting as lead agencies for these individual projects under CEQA, if and when a project applicant seeks a permit for a compliance-response-related project, this Draft EA takes the conservative approach in its postmitigation significance conclusion and discloses, for CEQA compliance purposes, that short-term construction-related impacts on transportation associated with the Proposed Regulation could remain **potentially significant and unavoidable**.

Impact 17-2: Long-Term Operation-Related Effects on Transportation

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[115] and Indiana locations,[116] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum

[115] Ibid., pp.24
[116] Ibid., pp.24

mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

The use of new or modified locomotives would not affect transportation in terms of VMT, emergency access, or hazards because locomotive manufacturing and operations would be similar to current activities and locations. For example, operations and maintenance that already occurs at railyards would continue to occur at railyards, and the Proposed Regulation would not affect the total cargo capacity or movements by rail.

Implementation of the Proposed Regulation could require the operation of new infrastructure and facilities to produce and distribute hydrogen fuels, as well as electrical facilities for charging and wayside power. The increase in lithium and platinum mining is expected to be extremely small; therefore, it is anticipated that a sufficient employment base would be available and that substantial new personnel would not be needed to operate new facilities. Thus, VMT associated with employees may not substantially increase depending on their location. Pursuant to SB 375, CARB established GHG reduction targets for metropolitan planning organizations that range from 13 to 19 percent by 2035. These are based on land use patterns and transportation systems specified in regional transportation plans and sustainable community strategies. Locations of new facilities cannot currently be known; therefore, the total change in VMT cannot be assessed. Many activities, such as lithium battery manufacturing, recycling, and refurbishing, would take place at existing facilities; however, long-term operation-related activities associated with deliveries and distribution of freight and fuels could result in the addition of new trips, which could increase VMT.

New facilities created as a result of the Proposed Regulation may result in additional egress/ingress points or increased traffic that would result in hazardous conditions on local roadways. Inadequate access may impede emergency vehicle access to new facilities. As a result, long-term operation-related impacts associated with the Proposed Regulation could be potentially significant.

Mitigation Measure 17-2

The regulatory setting in Attachment A includes applicable laws, regulations, and policies related to transportation. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with discretionary land use and/or permitting authority. New or modified facilities in California could qualify as a "project" under CEQA and be subject to CEQA review. The jurisdiction with primary approval authority over a proposed project is the lead agency, which is required to review the proposed project for compliance with CEQA statutes. To the extent new or modified facilities in California are subject to CEQA, 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 the following:

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

Because the authority to determine project-level impacts and require project-level mitigation lies with local land use and/or permitting agencies for individual projects, CARB finds it legally infeasible to implement and enforce this measure. Moreover, because of the programmatic analysis of this EA, which does not allow project-specific details of potential impacts and associated mitigation, there is inherent uncertainty regarding the degree of mitigation that lead agencies may ultimately implement to reduce the potentially significant impacts if they approve these potential projects.

Consequently, while impacts could likely be reduced to a less-than-significant level with mitigation measures imposed by the land use and/or permitting agencies acting as lead agencies for these individual projects under CEQA, if and when a project applicant seeks a permit for a compliance-response-related project, this Draft EA takes the conservative approach in its postmitigation significance conclusion and discloses, for CEQA compliance purposes, that long-term operation-related impacts on transportation associated with the Proposed Regulation could remain **potentially significant and unavoidable**.

18. Tribal Cultural Resources

Impact 18-1: Short-Term Construction-Related and Long-Term Operation-Related Impacts on Tribal Cultural Resources

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[117] and Indiana locations,[118] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of

[117] Ibid., pp.24
[118] Ibid., pp.24

existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

Tribal cultural resources include sites, features, places, cultural landscapes, sacred places, and objectives with cultural value to a California Native American tribe. New locomotive construction would primarily take place at existing manufacturing facilities outside of California, similar to existing conditions. Therefore, these activities would not affect tribal cultural resources. The Proposed Regulation could result in construction of a variety of facilities and infrastructure, which would require ground disturbance. Because the locations of any future new facilities or infrastructure are unknown, there is a possibility that they may be in or adjacent to a region that is a tribal cultural resource or that contains a tribal cultural resource. Therefore, ground-disturbing activities associated with construction of new facilities or infrastructure could encounter tribal cultural resources.

Operation of new and/or modified locomotives, facilities, and infrastructure would not require ground disturbance in addition to that performed during construction and modification because operation activities would occur within the footprint of the constructed or modified facility. Therefore, most operational activities would not have the potential to affect tribal cultural resources. However, the presence of new infrastructure, in and of itself, may change the setting or other attributes of the surrounding area, which could adversely affect trial cultural resources, as determined by a California Native American tribe.

Additionally, the increased demand for lithium-ion battery storage and fuel cells could result in an increase in lithium and platinum mining. Ground-disturbing activities from hard rock and continual brine mining activities could affect areas and resources that are considered tribal cultural resources, particularly if that location is considered a sacred place of cultural value to a tribe.

Therefore, short-term construction-related and long-term operation-related impacts on tribal cultural resources associated with the Proposed Regulation could be potentially significant.

Mitigation Measure 18-1

The regulatory setting in Attachment A includes applicable laws and regulations that relate to tribal cultural resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities or infrastructure that would be approved by State or local jurisdictions or jurisdictions outside of California. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California could qualify as a "project" under CEQA and be subject to CEQA review. The jurisdiction with primary approval authority over a proposed project is the lead agency, which is required to review the proposed project for compliance with CEQA statutes. To the extent new or modified facilities in California are subject to CEQA, project-specific impacts and mitigation would be identified during the environmental review by agencies with project-approval authority. Recognized practices routinely required to avoid and/or minimize impacts on tribal cultural resources include the following:

- Proponents of new or modified facilities or infrastructure constructed as a result of reasonably foreseeable compliance responses to the Proposed Regulation would coordinate with State or local land use agencies to seek entitlements for development and meet all necessary environmental review requirements (e.g., those under CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.
- Based on the results of the environmental review, proponents would implement all feasible mitigation identified in the environmental document to reduce or substantially lessen the significant environmental impacts of the project on tribal cultural resources. Any mitigation specifically required for a new or modified facility or infrastructure would be determined by the State or local lead agency. However, future environmental documents prepared by State or local lead agencies could include the following mitigation measures:
    - Retain the services of tribal cultural resources specialists with training and background that conforms to the U.S. Secretary of the Interior's Professional Qualifications Standards, as published in Title 36, Code of Federal Regulations, Part 61.
    - Seek guidance from the State Historic Preservation Officer, as well as State and federal lead agencies, as appropriate, for coordination of nation-to-nation consultations with the Native American tribes.
    - Conduct consultation as required with California Native American tribes under AB 52. Provide notice to Native American tribes of project details to identify potential tribal cultural resources. If a tribal cultural resource is identified, implement mitigation measures that:
        - Avoid and preserve the resource in place.

- Treat the resource with culturally appropriate dignity.
- Employ permanent conservation easements.
- Protect the resource.

- Regulated entities should consult with lead agencies early in the planning process to identify the potential presence of cultural properties. The agencies should provide the project developers with specific instruction on policies for compliance with the various laws and regulations governing tribal cultural resources management, including coordination with regulatory agencies and Native American tribes.

Because the authority to determine project-level impacts and require project-level mitigation lies with State or local land use and/or permitting agencies for individual projects, CARB finds it legally infeasible to implement and enforce this measure. Moreover, because of the programmatic analysis of this EA, which does not contain project-specific details of potential impacts and associated mitigation, there is inherent uncertainty regarding the degree of mitigation that lead agencies may ultimately implement to reduce the potentially significant impacts if they approve these potential projects.

Consequently, while impacts would likely be reduced to a less-than-significant level with mitigation measures imposed by the land use and/or permitting agencies acting as lead agencies for these individual projects under CEQA, it cannot be determined with certainty that impacts would be reduced to less than significant given that the authority to require these measures is within the responsibility and jurisdiction of another agency and not CARB. Therefore, this Draft EA takes the conservative approach in its postmitigation significance conclusion and discloses, for CEQA compliance purposes, that if and when a project applicant seeks a permit for a compliance-response-related project, short-term construction-related and long-term operation-related impacts on tribal cultural resources associated with the Proposed Regulation could remain **potentially significant and unavoidable**.

19. Utilities and Service Systems

Impact 19-1: Short-Term Construction-Related and Long-Term Operation-Related Impacts on Utilities and Service Systems

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at

their Pennsylvania, Texas,[119] and Indiana locations,[120] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

For locomotive manufacturing and remanufacturing that would take place at existing facilities and use similar methods, it is anticipated that existing utilities would be sufficient to serve these operations. However, new facilities, such as those associated with the production and distribution of batteries and hydrogen fuel cells could result in an increase in the demand for water, wastewater treatment, stormwater drainage, energy, and solid waste services in their local areas. New facilities may require new utility service lines and connections. At this time, the specific location, type, and number of new facilities that would be developed is not known and would be dependent upon a variety of market factors that are not within the control of CARB, including economic costs, product demands, and environmental constraints. Therefore, the ultimate magnitude and location of demand for utilities such as water and wastewater cannot be known. However, these facilities are unlikely to cause exceedances in wastewater treatment requirements of the applicable regional water quality control board such that construction of new wastewater treatment infrastructure and/or plants would be required. Additionally, because of the size and nature of these facilities, it is unlikely that these facilities would generate levels of solid waste that exceed an existing landfill's capacity. However, there is a potential that new facilities may require new or expanded stormwater drainage facilities or produce water demand in exceedance of available water supplies. Therefore, there could be significant environmental impacts associated with utilities.

The electricity for wayside power required to charge electric locomotives is anticipated to be supplied by local utility companies. Because of the size of the locomotives, it is not expected that the increase in electricity use would be so large that utility companies would have

[119] Ibid., pp.24
[120] Ibid., pp.24

insufficient energy supply; however, distributed generation resources or lithium-ion storage batteries could be relied on during rare cases when total energy demand is high and the energy grid is experiencing peak levels of demand. Use of wayside power would divert energy demand from the direct burning of fossil fuels to the electricity grid. Pursuant to State law (i.e., SB 350, SB 100), public utilities must incrementally increase their portion of renewable energy to their energy portfolio. As discussed in greater detail under Impact 6-2, "Long-Term Operation-Related Impacts on Energy," public utilities are continually modifying their infrastructure and developing strategies to diversify the grid. This is due in large part to increasing demand for use of electric vehicles in an effort to reduce the state's GHG emissions.

Reasonably foreseeable compliance responses to the Proposed Regulation could result in an increase in demand for lithium-ion storage batteries and hydrogen fuel cells, which could generate waste. For example, spent lithium-ion may be recycled, and because of increasing demand for other lithium-ion based batteries (e.g., for ZE vehicles and technologies), rates of lithium-ion battery recycling have increased. In 2015, the first U.S. recycling facility for lithium-ion batteries began operating in Lancaster, Ohio, while seven other companies located in Canada and the United States have begun recycling, or intend to begin recycling, lithium metal and lithium-ion batteries.[121] In California, disposal of lithium-ion batteries within the state would be required to comply with California's Universal Waste Rule (22 CCR Chapter 23), which contains regulations to prohibit the disposal of used batteries in landfills, thereby ensuring that lithium-ion batteries would be properly disposed of. In the United States overall, there are limited regulations for the disposal of lithium-ion batteries; however, because of the value of rarer metals (e.g., cobalt), there is incentive to collect and recycle batteries. When applied, typical recycling procedures (i.e., hydrometallurgical recovery, high-temperature or pyrometallurgical, and direct recycling) recover an average of approximately 97 percent of the battery material, redirecting only about 3 percent of battery waste to landfills.[122] Notably, these figures pertain to batteries subject to recycling, which not all batteries are. Therefore, battery disposal occurring outside of California could be directed to a landfill.

Thus, short-term construction-related and long-term operation-related impacts on utilities and service systems associated with the Proposed Regulation could be potentially significant.

Mitigation Measure 19-1

The regulatory setting in Attachment A includes applicable laws, regulations, and policies related to utilities and service systems. CARB does not have the authority to require implementation of mitigation related to new or modified facilities or infrastructure that would

[121] U.S. Geological Survey, Mineral Commodity Summaries, 2022. (weblink: https://pubs.usgs.gov/periodicals/mcs2022/mcs2022.pdf).

[122] U.S. Environmental Protection Agency, Application of Life-Cycle Assessment to Nanoscale Technology: Lithium-Ion Batteries for Electric Vehicles, April 24, 2013. (weblink: https://www.epa.gov/sites/production/files/2014-01/documents/lithium_batteries_lca.pdf).

be approved by State or local jurisdictions or jurisdictions outside of California. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in California could qualify as a "project" under CEQA and be subject to CEQA review. The jurisdiction with primary approval authority over a proposed project is the lead agency, which is required to review the proposed project for compliance with CEQA statutes. To the extent new or modified facilities in California are subject to CEQA, 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 system-related impacts include the following:

- Proponents of new or modified facilities or infrastructure constructed as a result of reasonably foreseeable compliance responses to the Proposed Regulation would coordinate with State or local land use agencies to seek entitlements for development and meet all necessary environmental review requirements (e.g., those under CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.
- Based on the results of the environmental review, proponents would implement all feasible mitigation identified in the environmental document to reduce or substantially lessen the significant environmental impacts of the project on utilities and service systems. Any mitigation specifically required for a new or modified facility or infrastructure would be determined by the State or local lead agency. However, future environmental documents prepared by State or local lead agencies could include the following mitigation measures:
    - Comply with local plans and policies regarding the provision of water supply, wastewater treatment, stormwater drainage, and solid waste services and facilities.
    - Where an on-site wastewater system is proposed, submit a permit application to the appropriate local jurisdiction and include the application with development proposals submitted to appropriate lead agencies.
    - Where appropriate, prepare a water supply assessment consistent with the requirements of Section 21151.9 of the Public Resources Code/Section 10910 et seq. of the Water Code. The water supply assessment would need to be approved by the local water agency/purveyor before construction of the project.
    - Comply with applicable State and local waste diversion requirements during construction and operation of new or modified facilities or infrastructure.

Because the authority to determine project-level impacts and require project-level mitigation lies with State or local land use and/or permitting agencies for individual projects, CARB finds it legally infeasible to implement and enforce this measure. Moreover, because of the

programmatic analysis of this EA, which does not contain project-specific details of potential impacts and associated mitigation, there is inherent uncertainty regarding the degree of mitigation that lead agencies may ultimately implement to reduce the potentially significant impacts if they approve these potential projects.

Consequently, while impacts would likely be reduced to a less-than-significant level with mitigation measures imposed by the land use and/or permitting agencies acting as lead agencies for these individual projects under CEQA, it cannot be determined with certainty that impacts would be reduced to less than significant given that the authority to require these measures is within the responsibility and jurisdiction of another agency and not CARB. Therefore, this Draft EA takes the conservative approach in its postmitigation significance conclusion and discloses, for CEQA compliance purposes, that if and when a project applicant seeks a permit for a compliance-response-related project, short-term construction-related and long-term operation-related impacts on utilities and service systems associated with the Proposed Regulation could remain **potentially significant and unavoidable**.

20. Wildfire

Impact 20-1: Short-Term Construction-Related and Long-Term Operation-Related Impacts on Wildfire

The purchase, remanufacture, or repower of cleaner and ZE locomotives by locomotive operators in response to the spending account and in-use operational requirements of the Proposed Regulation may result in increased manufacturing at the facilities that manufacture these types of locomotives. This could result in the need to develop new manufacturing facilities and/or expand existing manufacturing facilities to accommodate the increased demand for cleaner and ZE locomotives. However, it is anticipated that the majority of locomotive manufacturing within the United States would continue to be conducted at facilities owned by the largest U.S. locomotive manufacturers, Wabtec and Progress Rail, at their Pennsylvania, Texas,[123] and Indiana locations,[124] similar to existing conditions. The Proposed Regulation could also result in the incorporation of ZE technologies, such as lithium batteries and hydrogen fuel cells, into new locomotive production and/or modification of existing locomotives. Increased use of lithium batteries could incrementally increase lithium mining and exports from countries with raw mineral supplies, with some lithium demand being met domestically. The increase in the use of batteries could also require new facilities and the expansion of existing facilities for recycling and disposal. The increased demand for hydrogen fuel cells could require the development of new manufacturing facilities and/or expansion of existing manufacturing facilities, as well as the development of new hydrogen generation facilities. The use of hydrogen fuel may require transport of hydrogen to railyards and other areas where locomotives are operated, such as industrial facilities, as well as

[123] Ibid., pp.24
[124] Ibid., pp.24

development of fueling infrastructure or modification of existing facilities and infrastructure. Increased demand for fuel cells could also result in an extremely small increase in platinum mining and exports from source countries or other states and a related increase in recycling, refurbishment, or disposal of hydrogen fuel cells. The need for land-based electrical power could result in construction of new infrastructure or modification of existing infrastructure (e.g., substations, high-voltage cable lines, power meters, and circuit breaker main cabinets) to facilitate electric locomotive charging and wayside power systems.

In the event of an emergency, such as a wildfire, evacuation coordination is dealt with at various levels of government through federal, State, or local agencies as appropriate. The California Department of Forestry and Fire Protection (CAL FIRE) is responsible for coordinating wildfire response and protection within State Responsibility Areas. CAL FIRE does not have responsibility for fire response in Local Responsibility Areas or Federal Responsibility Areas, which are defined based on land ownership, population density, and land use. These areas include densely populated areas, such as cities and towns; agricultural lands; and lands administered by the federal government. In densely populated areas, local fire departments respond to fires and emergencies. Fire response on federal lands is coordinated by the appropriate federal agency. For example, on National Forest System lands, the U.S. Forest Service coordinates fire response; on lands administered by the U.S. Bureau of Land Management (BLM), BLM coordinates fire response.

Individual facilities and associated infrastructure would be placed within response areas for various jurisdictions and would be dealt with in the same manner as existing infrastructure. Construction- and operation-related activities, as well as new or modified facilities, would likely occur within footprints of existing manufacturing facilities or in areas that are zoned for industrial or other appropriate uses; therefore, changes or modifications to existing fire response and evacuation plans would not be necessary. Likewise, the increase in use at battery or fuel cell manufacturing, refurbishing, and recycling facilities would occur at existing facilities that are already under an assigned jurisdiction for fire safety. In addition, projects implemented under the Proposed Regulation would not create growth substantial enough to impede emergency response or affect evacuation route capacity, as discussed under Impact 14-1, above.

Overhead powerlines associated with new infrastructure could increase the risk of wildfire ignition; however, new safety initiatives, development standards, and regulatory oversight for electric utilities have been implemented in response to numerous devastating wildfires in California in recent years. These efforts aim to reduce the risk of wildfire ignition associated with such facilities and include implementation of wildfire mitigation plans, collaboration between utilities and CAL FIRE, and retention by CPUC of independent evaluators that can assess the safety of electrical infrastructure. Additionally, new facilities would be subject to the applicable chapters of the California Fire Code and any additional local provisions identified in local fire safety codes. These factors—adherence to local plans, policies, codes, and ordinances; adherence to the California Fire Code and the provisions of wildfire

prevention plans; and oversight by CPUC—would substantially reduce the risk of wildfire ignitions caused by infrastructure development.

As discussed above in Impact 9-2, lithium batteries have caused large explosions as a result of vehicular accidents. These explosions could be a source of ignition for wildland fires. The likelihood to overheat or ignite is increased if the batteries are poorly packaged, damaged, or exposed to a fire or other heat source. However, when packaged and handled properly, lithium batteries pose no environmental hazard (79 *Federal Register* 46011, 46032). Thus, the increased use of lithium-based batteries would not substantially increase the risk of wildland fire.

Therefore, short-term construction-related and long-term operation-related impacts related to wildfire associated with the Proposed Regulation would be **less than significant**.

V. Cumulative and Growth-Inducing Impacts

A. Approach to Cumulative Analysis

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

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

Consistent with CEQA Guidelines Section 15130(b)(1)(B), CARB has decided to use the "summary of projections" approach, using information from the Community Air Protection Blueprint (Blueprint).[125] CARB prepared the Blueprint to meet the requirements of AB 617 and provide the structure for the Community Air Protection Program (Program). The Blueprint is not a regulation but provides commitments from CARB; lays the foundation for the Program; and serves as a guidance document for local air districts, the public, and other stakeholders. In terms of air quality, the Blueprint identifies strategies that would reduce emissions and exposure of toxic air contaminants (TACs) in pollution-burdened communities. For the Community Air Protection Blueprint EA, CARB identified reasonably foreseeable

[125] CARB, Community Air Protection, Blueprint, October 2018 (weblink: https://ww2.arb.ca.gov/resources/documents/final-community-air-protection-blueprint).

compliance responses, which included a range of emission reduction strategies. While the Blueprint did not include the Proposed Regulation, it does include evaluation and potential development of regulations to reduce idling for all railyard sources and evaluation and potential development of regulations to reduce emissions from locomotives.

The Blueprint EA provided a program-level review of significant adverse impacts associated with the reasonably foreseeable compliance responses that appeared most likely to occur. The impact discussion identifies, where relevant, construction-related effects, operation-related effects of new or modified facilities, and influences of the recommended actions on greenhouse gas (GHG) and air pollutant emissions. The Blueprint EA considered cumulative impacts of a full range of reasonably foreseeable compliance responses to all the recommendations, including the Proposed Regulation, and considered the cumulative effect of other "closely related" past, present, and future reasonably foreseeable activities undertaken to address air quality at the State level, as well as other activities with "related impacts" (CEQA Guidelines Sections 15355[b], 15130[a][1]).

CARB has determined that the cumulative effects of the Proposed Regulation have been examined at a sufficient level of detail in the Blueprint EA. Therefore, CARB has determined that for a cumulative analysis of the Proposed Regulation, it is appropriate to rely on the cumulative analysis contained in the Blueprint EA. The analysis in the Blueprint EA is hereby incorporated by reference. The portions of the Blueprint EA relevant to this discussion are also summarized below. The significance conclusions in the Blueprint EA are given substantial weight in determining whether there would be a cumulative impact because the Blueprint consists of a broad and comprehensive suite of strategies that could result in environmental impacts.

The analysis of cumulative impacts includes:

1. a summary of the cumulative impacts found for each resource area in the Community Air Protection Blueprint EA (certified by the Board in September 2018);

2. a discussion of the types of compliance responses associated with the Proposed Regulation, pertinent to each resource area; and

3. significance conclusions that determine whether the Proposed Regulation could result in a significant cumulative effect or a considerable contribution to an existing significant cumulative impact.

This approach to cumulative impacts analysis is "guided by the standards of practicality and reasonableness" (Title 14 CCR Section 15130[b]) and serves the purpose of providing "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).

1. Summary of Community Air Protection Blueprint and Reasonably Foreseeable Compliance Responses

The objectives of the Community Air Protection Blueprint are to:

1. provide core elements for the Program;
2. provide a process and criteria for the identification, assessment, and selection of communities for community emissions reduction programs and air monitoring;
3. describe the tools and resources to be used in future planning to identify strategies to reduce exposure and emissions in pollution-burdened communities;
4. provide the criteria necessary for community air monitoring;
5. provide the criteria necessary for community emissions reduction programs to achieve the requirements of Assembly Bill (AB) 617 as set out in the Health and Safety Code (see Health and Safety Code Section 44391.2);
6. provide other measures to ensure the success of the Program, which include regulatory measures that CARB could undertake using its authorities, funding programs, a statewide emission reporting system, a technology clearinghouse, and other resources as described in Section C below;
7. further the objectives set forth in AB 617 to support a reduction of emissions of TACs and criteria air pollutants in communities affected by a high cumulative exposure burden; and
8. develop a strategy that is consistent with and meets the goals of AB 617.

In addition to identifying supporting tools and resources, recommendation of communities, criteria for community air monitoring, and criteria for community emissions reduction programs, the Blueprint reduces emissions and exposure to TACs through 11 emission reduction strategies: evaluation and potential development of regulation to reduce idling for all railyard sources, drayage trucks at seaports and railyards amendment, cargo-handling equipment amendment, catalytic converter theft reduction, chrome plating control measures amendment, composite wood products control measure amendments, commercial cooking suggested control measure, heavy-duty on-road and off-road engine in-use testing, incentive funding to support immediate emission reductions, amendment for commercial harbor craft, and the Proposed Regulation.

a) Evaluation and Potential Development of Regulation to Reduce Idling for All Railyard Sources

This strategy involves evaluating and potentially developing a regulation that requires operators to limit idling of all combustion-powered vehicles and mobile equipment operating at railyards and other locations, as well as reduce emissions from stationary locomotive operations (e.g., maintenance and testing). The scope could include both freight and passenger rail activities in and around intermodal, classification, and maintenance railyards; at seaports, at warehouses, on sidings, and at passenger rail stations; and at maintenance and service locations.

Reasonably foreseeable compliance responses could include:

1. changes to operational practices at facilities, installation of idle-limiting devices or idle-restricting devices, installation of capture and control technology, and replacement of equipment with ZE or near-ZE technology;

2. temporarily increased demand for associated equipment and incentive funds for equipment updates;

3. construction and operation of infrastructure, such as new hydrogen fueling stations and electric vehicle (EV) charging stations;

4. increased demand for lead acid and lithium-ion batteries, which could require an increase in manufacturing and recycling facilities and associated increases in lithium mining and exports from countries with raw mineral supplies; and

5. construction and operation of new facilities or modifications to existing facilities to accommodate battery recycling activities.

b) Evaluation and Potential Development of Regulation to Reduce Emissions from Locomotives

This strategy involves evaluating and potentially developing a regulation that requires the retrofit, repower, remanufacture, or replacement of freight and passenger locomotives beginning in 2025. As an alternative, CARB could also consider a voluntary agreement with the major railroads to secure greater community health benefits by reducing emissions from interstate locomotives (the dominant source of emissions and community health risk at railyards). This strategy essentially represents the Proposed Regulation.

Reasonably foreseeable compliance responses could include:

1. temporarily increased replacement rate of locomotives and locomotive engines, requiring that older models are sold outside of California, scrapped, or recycled;

2. construction of new or modifications to existing manufacturing facilities; and

3. temporarily increased demand for incentive funds to assist in replacement, repower, or retrofit of associated equipment.

c) Drayage Trucks at Seaports and Railyards Amendment

This strategy involves amending the existing drayage truck regulation, or adopting a new regulation, to direct a transition to ZE operations, beginning in 2026–2028. Options to be considered include, but are not limited to, requirements for full ZE technology (e.g., a battery or fuel-cell electric short-haul truck) and ZE mile capability (e.g., a natural gas-electric hybrid that could drive interstate but switch to ZE electric mode while operating near pollution-burdened communities).

Reasonably foreseeable compliance responses could include:

1. construction and operation of equipment to support ZE and near-ZE technologies, such as new hydrogen fueling stations and EV charging stations, as well as new or modified roadway infrastructure;

2. increased demand for lithium-ion batteries, including an increased demand for refurbishing or reusing batteries, as well as new facilities, or modifications to existing facilities to accommodate battery recycling activities;

3. construction and operation of new facilities or modifications to existing facilities to accommodate battery recycling activities; and

4. disposal or sale of noncompliant equipment to areas outside of California.

d) Cargo-Handling Equipment Amendment

This strategy involves amending the existing cargo-handling equipment regulation. This regulation applies to equipment including yard trucks, rubber-tired gantry cranes, container handlers, and forklifts. The strategy involves proposing an implementation schedule for new equipment and infrastructure requirements, with a focus on the transition to ZE operation and may include provisions for efficiency improvements.

Reasonably foreseeable compliance responses could include:

1. manufacturing and use of ZE and near-ZE cargo handling equipment for use within seaports and railyards;

2. construction and operation of infrastructure such as new hydrogen fueling stations and EV charging stations;

3. increased demand for lead acid and lithium-ion batteries, which could require an increase in manufacturing and recycling facilities and associated increases in lithium mining and exports from countries with raw mineral supplies;

4. construction and operation of new facilities or modifications to existing facilities to accommodate battery recycling activities; and

5. recycling, scrapping, and/or disposing of noncompliant equipment or selling of equipment to areas outside of California.

e) Catalytic Converter Theft Reduction

A regulation would require manufacturers to stamp catalytic converters with a vehicle identification number (VIN). Compliance assistance would offer free VIN stamping on converters in communities selected through the community identification and selection process. The strategy would make it easier for the recycler to identify stolen catalytic converters.

Reasonably foreseeable compliance responses could include:

1. update to the car manufacturing process to etch VINs into catalytic converters and/or install VIN etching equipment within communities selected through the community assessment process.

The Community Air Protection Blueprint EA concluded that this strategy would not result in a physical change in the environment; therefore, it was not evaluated further in the EA.

f) Chrome Plating Control Measures Amendment

This strategy involves amending the existing chrome plating regulation to incorporate provisions to align with the federal chrome plating regulation and considering additional measures to further reduce emissions from chrome plating operations. The amendments would include the prohibition of perfluorooctane sulfonate-containing fume suppressants (as required by federal regulation), changes to the surface tension requirements, and other actions to reduce uncontrolled emissions. Additionally, staff would evaluate less toxic alternatives to hexavalent chromium and options to phase out perfluorinated chemicals used in fume suppressants.

Reasonably foreseeable compliance responses could include:

1. installation of add-on control equipment for hexavalent chromium-containing tanks currently unregulated in the Chrome Plating Airborne Toxic Control Measure;

2. installation of building enclosures and associated ventilation systems, enhanced housekeeping and best management practices, periodic source testing, parametric

monitoring to test the performance of add-on control equipment, and a change to alternative, less hazardous chemical fume suppressants; and

3. construction activities to facilitate installation of add-on control equipment and building enclosures.

g) Composite Wood Products Control Measure Amendments

This strategy involves amending the existing Airborne Toxic Control Measure (ATCM) to Reduce Formaldehyde Emissions from Composite Wood Products (Composite Wood Products ATCM) to obtain additional formaldehyde emission reductions, clarify requirements and applicability, improve enforceability, and align with the U.S. Environmental Protection Agency's formaldehyde regulation, where appropriate. The Composite Wood Products ATCM, approved in 2007, established formaldehyde emission standards for three types of composite wood products (hardwood plywood, particleboard, and medium-density fiberboard) and requires that all consumer goods that contain such materials (e.g., flooring, cabinets, furniture) destined for sale in California must comply with the Composite Wood Products ATCM.

Reasonably foreseeable compliance responses could include:

1. development of manufacturing systems or alternative, lower-emitting glues that achieve the same curing rates and strength characteristics as current urea formaldehyde glues and

2. installation of new manufacturing systems that could result in construction activities.

h) Commercial Cooking Suggested Control Measure

This strategy involves evaluating California's current emission reduction requirements for commercial cooking operations that prepare food for human consumption and, if necessary, making improvements to achieve additional reductions in respirable and fine particulate matter (PM_{10} and $PM_{2.5}$, respectively) and volatile organic compound (VOC) emissions that contribute to ozone formation. In the first of two phases, CARB would conduct a technical assessment to evaluate the stringency of existing local air district (e.g., air pollution control and air quality management districts) commercial cooking rules and assess the commercial availability, effectiveness, and cost of more advanced emission control devices or methods to determine the potential for additional PM_{10}/$PM_{2.5}$ and VOC emission reductions. In the second phase, CARB would use the results of the technical assessment to develop a path forward for additional emission reductions from commercial cooking operations that could include adoption of a Suggested Control Measure or a combination of upfront incentives to install advanced emission controls with a recommended regulatory backstop.

Reasonably foreseeable compliance responses could include:

1. installation of proven control technologies and applied technologies used in other industry sectors to control emissions that are transferable, such as catalytic oxidizers, self-cleaning ceramic filters, filter-bed filters, thermal incinerators, electrostatic precipitators, wet scrubbers, and carbon absorbers, and

2. improved maintenance and control device certification requirements.

i) Heavy-Duty On-Road and Off-Road Engine In-Use Testing

This strategy involves real-world screening of heavy-duty trucks and off-road engines operating in selected communities to target heavy-duty in-use compliance testing. Engines that are found to be emitting above-expected levels would be brought into CARB's in-use compliance program. Engines found to be in noncompliance would be recalled, and emission mitigation projects could include deployment of ZE technology in selected communities.

Reasonably foreseeable compliance responses could include:

1. real-world testing of heavy-duty and off-road engines;

2. construction and operation of equipment to support ZE and near-ZE technologies, such as new hydrogen fueling stations and EV charging stations;

3. increased demand for lead acid and lithium-ion batteries, which could require an increase in manufacturing and recycling facilities and associated increases in lithium mining and exports from countries with raw mineral supplies; and

4. construction of new and modifications to existing facilities to accommodate battery recycling activities.

j) Incentive Funding to Support Immediate Emission Reductions

This strategy involves using incentive funding for projects to support early action to reduce emissions through the deployment of cleaner mobile source technologies in pollution-burdened communities. The governor's Fiscal Year 2017-2018 budget included $250 million for this purpose. As directed by the legislature, these funds were administered through the Carl Moyer Memorial Air Quality Standards Attainment Program, except that at its discretion, an air district may allocate up to 40 percent of the funds it receives to incentivize clean trucks in accordance with CARB's Proposition 1B Goods Movement Emission Reduction Program Guidelines.

Reasonably foreseeable compliance responses evaluated in the Community Air Protection Blueprint EA included:

1. CARB and air districts holding community and stakeholder meetings to determine funding needs, CARB updating or creating funding program guidelines, and CARB interfacing with community groups to provide community funding.

k) Commercial Harbor Craft Amendment

As described in the Blueprint EA, the strategy would amend the existing commercial harbor craft regulation to include more stringent in-use and new vessel requirements for both freight-related and passenger vessels. The amendments would take into consideration the feasibility of Tier 4 engine technology in commercial harbor craft applications, the performance of advanced retrofit emission control devices, and the availability of ZE and near-ZE technologies for the sector.

Reasonably foreseeable compliance responses as identified in the Community Air Protection Blueprint EA, could include:

1. increase in manufacturing and use of Tier 4 engine technology, advanced retrofit emission control devices, and new vessels containing such technologies;

2. potential acceleration of turnover of engines, vessels, and their components, which may increase recycling, scrapping, and/or disposing of these materials within or outside of California or selling these materials outside of California;

3. potential acceleration of adoption of ZE and near-ZE technologies, which could require construction and operation of equipment to support ZE and near-ZE technologies, such as new hydrogen fueling stations and electric vehicle charging stations;

4. increased demand for lead acid and lithium-ion batteries, which could require an increase in manufacturing and recycling facilities and associated increases in lithium mining and exports from countries with raw mineral supplies;

5. construction of new or modifications to existing battery recycling facilities to meet an increased demand for refurbishing or reusing batteries; and

6. potential effects on electricity demand, which would depend on factors such as timing of charging demand and diurnal supply patterns associated with new renewable electricity sources.

2. Summary of the Community Air Protection Blueprint Environmental Impacts

The Community Air Protection Blueprint EA evaluated the environmental impacts related to the reasonably foreseeable compliance responses described above. Table 3 provides a summary of the conclusions of these impacts.

Table 3: Summary of the Community Air Protection Blueprint Environmental Analysis by Resource126

Resource Areas and Impact Categories	Significance Determination
Aesthetics	
Construction and Operational Impacts	Potentially Significant and Unavoidable
Agriculture and Forestry Resources	
Construction and Operational Impacts	Potentially Significant and Unavoidable
Air Quality	
Air Quality Construction Impacts	Potentially Significant and Unavoidable
Air Quality Operational Impacts	Beneficial
Odor Construction and Operational Impacts	Less Than Significant
Biological Resources	
Construction Impacts	Potentially Significant and Unavoidable
Operational Impacts	Potentially Significant and Unavoidable
Cultural Resources	
Construction and Operational Impacts	Potentially Significant and Unavoidable

[126] CARB, Final Environmental Analysis, Final Draft Community Air Protection Blueprint. (weblink: https://ww2.arb.ca.gov/sites/default/files/2020-03/final_community_air_protection_blueprint_october_2018_appendix_g_acc.pdf).

Resource Areas and Impact Categories	Significance Determination
Energy	
Construction Impacts	Less Than Significant
Operational Impacts	Beneficial
Geology and Soils	
Construction and Operational Impacts	Potentially Significant and Unavoidable
Greenhouse Gas Emissions	
Construction and Operational Impacts	Beneficial
Hazards and Hazardous Materials	
Construction Impacts	Potentially Significant and Unavoidable
Operational Impacts	Less Than Significant
Hydrology and Water Quality	
Construction Impacts	Potentially Significant and Unavoidable
Operational Impacts	Potentially Significant and Unavoidable

Resource Areas and Impact Categories	Significance Determination
Land Use and Planning	
Construction and Operational Impacts	Potentially Significant and Unavoidable
Mineral Resources	
Construction Impacts	Less Than Significant
Operational Impacts	Potentially Significant and Unavoidable
Noise	
Construction Impacts	Potentially Significant and Unavoidable
Operational Impacts	Potentially Significant and Unavoidable
Population and Housing	
Construction and Operational Impacts	Less Than Significant
Public Services	
Construction and Operational Impacts	Less Than Significant
Recreation	
Construction and Operational Impacts	Less Than Significant
Transportation	
Construction Impacts	Potentially Significant and Unavoidable
Operational Impacts	Potentially Significant and Unavoidable

Resource Areas and Impact Categories	Significance Determination
Tribal Cultural Resources (topic addressed in "Cultural Resources" section)	
Construction and Operational Impacts	Not applicable
Utilities and Service Systems	
Operational Impacts	Potentially Significant and Unavoidable
Wildfire (topic addressed in "Hazards and Hazardous Materials" section)	
Operational Impacts	Not applicable

B. Significance Determinations and Mitigation

Implementation of the Proposed Regulation was determined to potentially result in cumulatively considerable contributions to significant cumulative impacts on certain resource areas, as discussed below. While suggested mitigation is provided for each potentially cumulatively considerable impact, the mitigation needs to be implemented by lead agencies responsible for permitting compliance-response projects. Where impacts cannot be feasibly mitigated, this Draft EA recognizes the impact as significant and unavoidable. The Board will need to adopt Findings and a Statement of Overriding Considerations for any significant and unavoidable environmental effects of the project as part of the approval process.

C. Cumulative Impacts by Resource Area

1. Aesthetics

The Community Air Protection Blueprint EA found that implementation of the reasonably foreseeable compliance responses for the various measures could result in a significant impact on aesthetic resources from construction and operational activities associated with new or modified facilities or infrastructure and increased lithium consumption. As discussed in the Blueprint EA, the exact location or character of these new facilities or the modification of existing facilities is uncertain. Depending on hours of construction, sources of glare or light may also be present. Construction activities would introduce typical off-road construction equipment and on-road heavy-duty vehicles, as well as staging areas and other typical construction activities. Development of new facilities is expected to occur in areas that are appropriately zoned; however, new facilities can also introduce or increase presence of

visible artificial elements (e.g., heavy-duty equipment, new or expanded buildings) in areas of scenic importance, such as locations visible from State scenic highways. Facilities may also introduce substantial sources of glare, exhaust plumes, and nighttime lighting for safety and security. The increase in demand for lithium could cause adverse visual effects related to increases in mining activity.

CARB cannot determine with certainty that implementing mitigation measures would reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the Community Air Protection Blueprint could result in a significant cumulative impact.

The Proposed Regulation's contribution to this significant impact would be cumulatively considerable because the development of new facilities and infrastructure, nighttime lighting, and lithium mining could affect the visual quality and character of a landscape or scenic vista. Implementation of the project-level mitigation identified in Chapter 4 could effectively reduce the incremental contribution from the Proposed Regulation to a less-than-considerable level, but authority to require that mitigation will rest with other agencies that will be authorizing site-specific projects and not with CARB. Therefore, the Proposed Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact on aesthetic resources**.

2. Agriculture and Forestry Resources

The Community Air Protection Blueprint EA found that implementation of the reasonably foreseeable compliance responses for the various measures could result in a significant impact on agriculture and forestry resources from construction and operational activities associated with new or modified facilities or infrastructure and increased lithium consumption. As discussed in the Blueprint EA, the exact location or character of these new facilities or modification of existing facilities is uncertain. However, new facilities could be located on Important Farmland, forest land, or timberland. Land use policies could generally avoid conversion of agricultural and forest lands, but the potential remains for conversion. Lithium extraction from brines occurs in desert areas that are generally not valuable for agriculture or forestry, but hard rock mining could result in the loss of agricultural or forest lands.

CARB cannot determine with certainty that implementing mitigation measures would reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the Community Air Protection Blueprint could result in a significant cumulative impact.

The Proposed Regulation's contribution to this significant impact would be cumulatively considerable because an increased need for lithium-ion batteries and hydrogen fuel cells could require the construction and operation of new or expanded facilities and infrastructure

in areas currently zoned for or supporting agriculture and forestry resources. Implementation of the project-level mitigation identified in Chapter 4 could effectively reduce the incremental contribution from the Proposed Regulation to a less-than-considerable level, but authority to require that mitigation will rest with other agencies that will be authorizing site-specific projects and not with CARB. Thus, the Proposed Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact on agriculture and forestry resources**.

3. Air Quality

The Community Air Protection Blueprint EA found that implementation of the reasonably foreseeable compliance responses for the various measures could result in significant impacts on air quality from construction activities associated with new or modified facilities or infrastructure. As discussed in the Blueprint EA, the exact location or character of these new facilities or modification of existing facilities is uncertain. However, construction and modification of facilities would emit criteria air pollutants and toxic air contaminants from a variety of activities, such as grading and excavation, operation of off-road construction equipment, and construction worker-commute trips. Based on typical emission rates and other parameters for above-mentioned equipment and activities, construction activities could result in hundreds of pounds of daily oxides of nitrogen (NO_X) and particulate matter emissions (amount generated from two to four pieces of heavy-duty equipment working 8 hours per day), which may exceed general mass emissions limits of a local or regional air quality management district depending on the location of the emissions. Thus, implementation of new, or amended, regulations and/or incentives could generate levels that conflict with applicable air quality plans, exceed or contribute substantially to an existing or projected exceedance of State or national ambient air quality standards, or expose sensitive receptors to substantial pollutant concentrations.

Implementation of mitigation measures may not reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the Community Air Protection Blueprint could result in a significant cumulative impact.

The Proposed Regulation's contribution to this significant impact during construction would be cumulatively considerable, as concluded in Chapter 4, because of air pollutant emissions caused by heavy-duty equipment, worker commute trips, and truck trips during construction. Implementation of the project-level mitigation identified in Chapter 4 could effectively reduce the incremental contribution from the Proposed Regulation to a less-than-considerable level, but authority to require that mitigation will rest with other agencies that will be authorizing site-specific projects and not with CARB. Thus, the Proposed Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact on air quality** during construction.

The Blueprint EA found that implementation of the reasonably foreseeable compliance responses for the various measures could cause increases in odors related to use of diesel equipment for construction, as well as odors related to increased mining, which can disturb odiferous compounds. However, these odors would be short term or generated in areas away from sensitive receptors. The Blueprint EA concluded this impact would be less than significant. Therefore, cumulative odor impacts would be less than significant. The Proposed Regulation **would not contribute to a significant cumulative odor impact**.

The Blueprint EA found that implementation of the reasonably foreseeable compliance responses for the various measures could result in beneficial impacts on air quality from operational activities associated with the Proposed Regulation. The purpose of the proposed Draft Blueprint is to improve air quality conditions in pollution-burdened communities, thus decreasing adverse air quality-related health effects. The measures within the proposed Draft Blueprint are designed to result in substantial long-term reductions in criteria air pollutants and TACs. Although it is possible that certain aspects of the proposed Draft Blueprint may cause comparatively small emission increases, these potential incremental increases would be offset by the overall substantial long-term reductions in criteria air pollutants and TACs. As a result, long-term operation-related impacts related to air quality as a result of the Blueprint would be beneficial. Thus, the Proposed Regulation would not result in a **cumulatively considerable contribution to a significant cumulative impact on air quality** during operations and would result in a **cumulatively beneficial contribution to reducing air emissions** during operations.

4. Biological Resources

The Community Air Protection Blueprint EA found that implementation of the reasonably foreseeable compliance responses for the various measures could require construction and operational activities associated with new or modified facilities or infrastructure and increased mining activities. The exact location of these new facilities or the modification of existing facilities is uncertain. Construction could require disturbance of undeveloped areas, such as clearing of vegetation; earth movement and grading; trenching for utility lines; erection of new buildings; and paving of parking lots, delivery areas, and roadways. These activities would have the potential to adversely affect biological resources (e.g., species, habitat) that may be present in those areas. Because there are biological species that occur, or even thrive, in developed settings, resources could also be adversely affected by construction and operations within disturbed areas at existing manufacturing facilities or at other sites in areas with zoning that would permit the development of manufacturing or industrial uses.

CARB cannot determine with certainty that implementing mitigation measures would reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the Community Air Protection Blueprint could result in a significant cumulative impact.

The Proposed Regulation's contribution to this significant impact would be cumulatively considerable because the development of new facilities and infrastructure, which would include vegetation removal and noise impacts, as well as mining, could adversely affect biological resources, such as special-status species. Implementation of the project-level mitigation identified in Chapter 4 could effectively reduce the incremental contribution from the Proposed Regulation to a less-than-considerable level, but authority to require that mitigation will rest with other agencies that will be authorizing site-specific projects and not with CARB. Therefore, the Proposed Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact** on biological resources.

5. Cultural Resources

The Community Air Protection Blueprint EA found that implementation of the reasonably foreseeable compliance responses associated with the recommended actions could require construction and operational activities associated with new or modified facilities or infrastructure and increased mining activities. The exact location of these new facilities or the modification of existing facilities is uncertain. Construction activities could require disturbance of undeveloped areas, such as clearing of vegetation; earth movement and grading; trenching for utility lines; erection of new buildings; and paving of parking lots, delivery areas, and roadways. 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 and structures, or archaeological sites associated with agriculture and mining, and heritage landscapes. Historic buildings and structures may also be adversely affected by demolition-related activities.

CARB cannot determine with certainty that implementing mitigation measures would reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the Community Air Protection Blueprint could result in a significant cumulative impact.

The Proposed Regulation's contribution to this significant impact would be cumulatively considerable, as concluded in Chapter 4, because of ground disturbance activities and the potential for new facilities to be sited within a historic district. Implementation of the project-level mitigation identified in Chapter 4 could effectively reduce the incremental contribution from the Proposed Regulation to a less-than-considerable level, but authority to require that mitigation will rest with other agencies that will be authorizing site-specific projects and not with CARB. Thus, the Proposed Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact** on cultural resources.

6. Energy

The Community Air Protection Blueprint EA found that implementation of the recommended measures within the various source categories would result in less-than-significant construction- and operation-related impacts. Increases in energy demand associated with new facilities would include temporary demand for fuels used during construction and demand for gas and electricity during operation. Typical earth-moving equipment that may be necessary for construction includes graders, scrapers, backhoes, jackhammers, front-end loaders, generators, water trucks, and dump trucks. While energy would be required to complete construction for any new or modified facilities or infrastructure projects, the demand would be temporary and limited in magnitude such that a reasonable amount of energy would be expended. In the long term, the Blueprint would increase the amount of renewable energy supplies because vehicular fuels would increase the use of electricity (50 percent of which would be renewable by 2030) and decrease the use of petroleum through increased use of plug-in hybrid electric vehicles and equipment, ZE vehicles and equipment, and low-emission diesel fuels. Therefore, the Blueprint would not have a cumulatively significant impact on energy, and the Proposed Regulation **would not result in a cumulatively considerable contribution to a significant cumulative impact** on energy.

7. Geology and Soils

Implementation of the reasonably foreseeable compliance responses associated with the recommended measures in the proposed Community Air Protection Blueprint could result in a significant cumulative impact related to geology and soils from construction and operational activities associated with new or modified facilities or infrastructure. New facilities and infrastructure, and expansion of agricultural lands to support low-emission diesel fuel feedstock, could be located in a variety of geologic, soil, and slope conditions with varying amounts of vegetation that would be susceptible to soil compaction, soil erosion, and loss of topsoil during construction. The exact location of these new facilities or the modification of existing facilities is uncertain. Construction and operation could be located in a variety of relatively high-risk geologic and soil conditions that are considered to be potentially hazardous. For instance, the seismic conditions at the site of a new facility may have high to extremely high seismic-related fault rupture and ground shaking potential associated with earthquake activity. New facilities could also be subject to seismic-related ground failure, including liquefaction and landslides. Construction and operational activities could be located in a variety of geologic, soil, and slope conditions with varying amounts of vegetation that would be susceptible to soil erosion. Strong ground shaking could also trigger landslides in areas where the natural slope is naturally unstable or is oversteepened by the construction of access roads and structures. Construction and operation could also occur in locations that would expose facilities and structures to expansive soil conditions. Development of new facilities could be susceptible to the presence of expansive soils, particularly in areas of fine-grained sediment accumulation typically associated with playas, valley bottoms, and local low-lying areas.

CARB cannot determine with certainty that implementing mitigation measures would reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the Blueprint could result in a significant cumulative impact.

The Proposed Regulation's contribution to this significant impact would be cumulatively considerable because of the potential for ground disturbance activities to cause erosion and for new facilities and infrastructure to be located in areas with a variety of seismic conditions. Implementation of the project-level mitigation identified in Chapter 4 could effectively reduce the incremental contribution from the Proposed Regulation to a less-than-considerable level, but authority to require that mitigation will rest with other agencies that will be authorizing site-specific projects and not with CARB. Thus, the Proposed Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact** on geology and soils.

8. Greenhouse Gas Emissions

The Community Air Protection Blueprint EA found that implementation of the recommended measures within the various source categories could require construction and operational activities associated with new manufacturing facilities to support increased market penetration of electric, battery, hydrogen fuel cell and other ZE technologies. Overall, the proposed Blueprint would result in substantial long-term GHG reductions, although certain aspects of the Blueprint would cause comparatively small short-term GHG emission increases. When these short-term construction-related GHG emissions are considered in relation to the overall long-term operational GHG benefits, they are not considered substantial. Therefore, the Blueprint would not have a cumulatively significant impact on GHG emissions. The Proposed Regulation would achieve GHG benefits and would not result in significant GHG emissions. Thus, the Proposed Regulation would not result in a **cumulatively considerable contribution to a significant cumulative impact** on GHG and would result in a **cumulatively beneficial contribution** to reducing GHG emissions.

9. Hazards and Hazardous Materials

The Community Air Protection Blueprint EA found that implementation of the reasonably foreseeable compliance responses associated with the recommended actions in the proposed Draft Blueprint could require construction and operational activities associated with new or modified facilities or infrastructure and increased mining activities. Construction activities generally use heavy-duty equipment requiring periodic refueling and lubricating. Large pieces of construction equipment (e.g., backhoes, graders) are typically fueled and maintained at the construction site. There would be a potential risk of accidental release during fuel transfer activities. Although precautions would be taken to ensure that any spilled fuel is properly contained and disposed of, and such spills are typically minor and localized to

the immediate area of the fueling (or maintenance), the potential still remains for a substantial release of hazardous materials into the environment.

CARB cannot determine with certainty that implementing mitigation measures would reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the Blueprint could result in a significant cumulative impact during construction.

The Blueprint EA concludes that operation-related impacts would be less than significant because of performance-based requirements and standards for lithium-ion batteries and hydrogen fueling stations. Therefore, the cumulative impact on hazards and hazardous materials would not be cumulatively significant.

The Proposed Regulation's contribution to this significant impact would be cumulatively considerable, as concluded in Chapter 4, because of the potential for accidental release of hazardous materials into the environment during the movement of raw goods during the operational phase. Implementation of the project-level mitigation identified in Chapter 4 could effectively reduce the incremental contribution from the Proposed Regulation to a less-than-considerable level, but authority to require that mitigation will rest with other agencies that will be authorizing site-specific projects and not with CARB. Thus, the Proposed Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact** regarding hazards and hazardous materials during operation and construction.

10. Hydrology and Water Quality

The Community Air Protection Blueprint EA found that implementation of the reasonably foreseeable compliance responses associated with the recommended actions could result in construction and operation activities, such as those associated with new or modified facilities or infrastructure and increased mining activities. Specific construction projects would be required to comply with applicable erosion measures, water quality standards, and waste discharge requirements. Depending on the location of construction activities, there could be adverse effects on drainage patterns and exposure of people or structures to areas susceptible to flood, seiche, tsunami, or mudflow.

CARB cannot determine with certainty that implementing mitigation measures would reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the Blueprint could result in a significant cumulative impact.

The Proposed Regulation's contribution to this significant impact would be cumulatively considerable, as concluded in Chapter 4, because of the possibility that new facilities and infrastructure would be located in areas subject to mudflow or flooding, the potential for

erosion and sedimentation during construction and lithium mining, and the potential for accidental release of fuel during fueling activities. Implementation of the project-level mitigation identified in Chapter 4 could effectively reduce the incremental contribution from the Proposed Regulation to a less-than-considerable level, but authority to require that mitigation will rest with other agencies that will be authorizing site-specific projects and not with CARB. Thus, the Proposed Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact** on hydrology and water quality.

11. Land Use and Planning

The Community Air Protection Blueprint EA found that implementation of the recommended measures within the various source categories would result in the construction and operation of new or modified facilities or infrastructure. Planning efforts associated with the implementation of compliance responses associated with the Blueprint would be made in coordination with local, State, or federal jurisdictions. However, individual projects that implement the Blueprint could result in land use compatibility impacts, inconsistency with plans and programs, division of established communities, or conflicts with conservation plans of local lead agencies. Thus, the Blueprint would have a cumulatively significant impact on land use and planning.

Implementation of the Proposed Regulation is not anticipated to divide an established community or conflict with a land use plan, policy, or regulation. Therefore, the Proposed Regulation **would not result in a cumulatively considerable contribution to a significant cumulative impact** related to land use and planning.

12. Mineral Resources

The Community Air Protection Blueprint EA found that implementation of the recommended measures within the various source categories would result in the construction and operation of new or modified facilities or infrastructure. Reasonably foreseeable compliance responses would likely occur within existing footprints or in areas with consistent zoning where original permitting and analyses considered the availability of mineral resources within specific project sites. In addition, increased manufacturing and use of electric, battery, and hydrogen fuel cell locomotives would require increased battery production and increased lithium mining. In the case that new lithium mines are required, the proposed mining projects would go through independent environmental review at the appropriate federal, State, or local level, and it is assumed that any new mines would be located in areas with appropriate zoning and would be subject to federal, State, and/or local requirements. Worldwide demand of global lithium is estimated to be below 20 million metric tons for the period of 2010 through 2100, which is well below the estimated worldwide reserves and resources currently known to exist worldwide. In addition, lithium-ion battery recycling potential could supplement future increased demand. Appendix G of the CEQA Guidelines considers an impact on mineral resources to be the loss of availability of a known mineral resource that would be of value to a local entity, a region, or the state. This type of impact could result

from actions such as building a structure over an area that contains mineral resources and thereby prohibiting access to mining activities or the consumption of a mineral resource. Because compliance responses could result in increased development where mining for lithium is feasible, they could conceivably affect the availability of these mineral resources if access to resources becomes impeded and result in a significant cumulative impact.

The Proposed Regulation's contribution to this significant impact would be negligible, because the increased demand for lithium and the potential for increased development where mining for lithium is feasible would be extremely small compared to the overall increased demand for lithium for other uses, as described in Chapter 4. Thus, the Proposed Regulation would **not result in a cumulatively considerable contribution to a significant cumulative impact** on mineral resources.

13. Noise

The Community Air Protection Blueprint EA found that implementation of the reasonably foreseeable compliance responses associated with the recommended actions could require construction and operational activities associated with new or modified facilities or infrastructure and increased mining activities. Implementation of reasonably foreseeable compliance responses could result in the generation of short-term construction noise from use of heavy-duty equipment and vehicle trips. New long-term operational sources of noise could be associated with manufacturing plants and mining activities. Depending on the proximity to existing noise-sensitive receptors, construction and operational noise levels could exceed applicable noise standards and result in a substantial increase in ambient noise levels, resulting in a significant noise impact.

CARB cannot determine with certainty that implementing mitigation measures would reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the Blueprint could result in a significant cumulative impact.

The Proposed Regulation's contribution to this significant impact would be cumulatively considerable because potential noise impacts would be associated with the construction and operation of new or expanded manufacturing and recycling facilities, as well as increased mining of lithium for ZE and near-ZE batteries. Implementation of mitigation measures identified in Chapter 4 has the potential to reduce these impacts to a less-than-significant level; however, the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. As a result, noise impacts may be substantial. Thus, the Proposed Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact** on noise.

14. Population and Housing

The Community Air Protection Blueprint EA found that implementation of the reasonably foreseeable compliance responses associated with the recommended actions could require construction and operational activities associated with new or modified facilities or infrastructure and increased mining activities. There is uncertainty as to the specific location of new facilities or the modification of existing facilities. Construction and operation of these facilities could result in increased job opportunities in the communities surrounding a project site. However, it would be expected that these facilities would be located where an appropriate employment base existed to support construction and operation or where local jurisdictions have planned for increased population and employment growth. Therefore, the Blueprint would not have a cumulatively significant impact on population and housing.

The Proposed Regulation would not generate population substantial enough to substantially increase a community's population, require the construction of housing, or displace housing. Thus, the Proposed Regulation would **not result in a cumulatively considerable contribution** to population and housing impacts.

15. Public Services

The Community Air Protection Blueprint EA found that implementation of the reasonably foreseeable compliance responses associated with the recommended actions could require construction and operational activities associated with new or modified facilities or infrastructure and increased mining activities. There is uncertainty as to the specific location of new facilities or the modification of existing facilities. Construction and operation of the reasonably foreseeable compliance responses would not require a substantial amount of new additional housing to accommodate increased populations or generate changes in land use and, therefore, would not be expected to increase population levels such that the provisions of public services would be substantially affected. Therefore, the Blueprint would not have a cumulatively significant impact on public services.

The Proposed Regulation would not result in significant impacts related to public service responses or require construction of new public service facilities that could result in significant environmental impacts. Thus, the Proposed Regulation would **not result in a cumulatively considerable contribution** to public services.

16. Recreation

The Community Air Protection Blueprint EA found that implementation of the recommended measures within the various source categories would result in the construction and operation of new or modified facilities or infrastructure (e.g., hydrogen refueling stations, lithium battery manufacturing facilities, lithium mines, battery recycling and disposal centers, electrical infrastructure). There is uncertainty as to the specific location of new facilities or the modification of existing facilities. While implementation of the Blueprint would produce long-term employment, it is anticipated that a sufficient employment base would be available. The

minimal increase in employment opportunity would not create an increased use of or demand for recreational facilities within communities containing new plants and facilities. Therefore, the Blueprint would not have a cumulatively significant impact on recreation.

The Proposed Regulation would not generate population substantial enough to increase a community's population or employment to such an extent that recreational resources could be affected. Thus, the Proposed Regulation would **not result in a cumulatively considerable contribution** to recreation impacts.

17. Transportation

The Community Air Protection Blueprint EA found that implementation of the recommended measures within the various source categories could result in a significant cumulative traffic impact from construction and operational activities associated with new or modified facilities or infrastructure. Although detailed information about potential specific construction activities is not currently available, it would be anticipated to result in short-term construction traffic (primarily motorized) from worker commute- and material delivery-related trips. Implementation of the Blueprint could result in increased demand for low-emission diesel fuels, such as R99, R100, or biomethane, and increased demand for feedstocks and inputs used to produce low-emission diesel. While the total volume of fuel demanded in California is not anticipated to be affected by the proposed low-emission diesel measure, it is anticipated to change the types of fuels consumed, which could result in substantial long-term effects on local routes' traffic patterns because of the differences in where feedstocks are sourced and how the finished fuels are transported. In addition, transportation patterns may change in relation to the location and operational shipping needs of new facilities. Depending on the number of trips generated 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 related to project-generated heavy-duty truck trips.

CARB cannot determine with certainty that implementing mitigation measures would reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the Blueprint could result in a significant cumulative impact.

The Proposed Regulation's contribution to this significant impact would be cumulatively considerable because of potential transportation impacts associated with the construction and operation of new or expanded manufacturing and recycling facilities, as well as increased mining of lithium for ZE and near-ZE batteries. Implementation of mitigation measures identified in Chapter 4 has the potential to reduce these impacts to a less-than-significant level; however, the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. As a result, transportation impacts may be substantial. Thus, the Proposed Regulation could result in a

cumulatively considerable contribution to a significant cumulative impact on transportation.

18. Tribal Cultural Resources

The Community Air Protection Blueprint EA found that implementation of the reasonably foreseeable compliance responses associated with the recommended actions could require construction and operational activities associated with new or modified facilities or infrastructure and increased mining activities. The exact location of these new facilities or the modification of existing facilities is uncertain. Construction activities could require disturbance of undeveloped areas, such as clearing of vegetation; earth movement and grading; trenching for utility lines; erection of new buildings; and paving of parking lots, delivery areas, and roadways. Demolition of existing structures may also occur before the construction of new buildings and structures. Resources important to Native American communities and other ethnic groups, including tangible properties possessing intangible traditional cultural values, may exist and be significantly affected.

CARB cannot determine with certainty that implementing mitigation measures would reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the Blueprint could result in a significant cumulative impact.

The Proposed Regulation's contribution to this significant impact would be cumulatively considerable, as concluded in Chapter 4, because of ground disturbance activities and the potential for these activities to be sited in or near a tribal cultural resource. Implementation of the project-level mitigation identified in Chapter 4 could effectively reduce the incremental contribution from the Proposed Regulation to a less-than-considerable level, but authority to require that mitigation will rest with other agencies that will be authorizing site-specific projects and not with CARB. Thus, the Proposed Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact** on tribal cultural resources.

19. Utilities and Service Systems

The Community Air Protection Blueprint EA found that implementation of the recommended measures within the various source categories could result in a significant cumulative impact on utilities and service systems from construction and operational activities associated with new or modified facilities or infrastructure (i.e., natural gas and hydrogen refueling stations, lithium battery manufacturing facilities, lithium mines, battery recycling and disposal centers, vehicle emission testing centers, ZE and near-ZE technology manufacturing facilities, infrastructure associated with low-emission diesel production). Projects associated with the Blueprint could result in new demand for water, wastewater, electricity, and gas services for new manufacturing facilities. Changes in land use associated with biofuel feedstock production are likely to change water demand to support new crop types, depending on the

size, location, and existing uses. This could result in an increase or decrease in water demand and would be subject to availability and regulatory requirements. The specific location and type of construction needs is not known and would be dependent upon a variety of market factors that are not within the control of CARB, including economic costs, product demand, environmental constraints, and other market constraints. Thus, the specific impacts from construction on utility and service systems cannot be identified with any certainty, and individual compliance responses could potentially result in significant environmental impacts.

CARB cannot determine with certainty that implementing mitigation measures would reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the Blueprint could result in a significant cumulative impact.

The Proposed Regulation's contribution to this significant impact would be cumulatively considerable because utilities impacts are associated with construction and operation of new or expanded manufacturing and recycling facilities, as well as increased mining of lithium for ZE and near-ZE batteries. Implementation of mitigation measures identified in Chapter 4 have the potential to reduce these impacts to a less-than-significant level; however, the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. As a result, utilities impacts may be substantial. Thus, the Proposed Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact** on utilities and service systems.

20. Wildfire

Appendix G of the State CEQA Guidelines was amended in late 2018, after certification of the Community Air Protection Blueprint EA, to include several questions related to wildfire. The CEQA Guidelines Appendix G questions address impairment of an adopted emergency response plan or emergency evaluation plan; the potential to exacerbate wildfire risks and associated pollutants and uncontrolled spread of wildfire; the requirement to install or maintain infrastructure that could exacerbate fire risk; and the exposure of people or structure to significant risks, including downslope or downstream flooding or landslides as a result of runoff, postfire slope instability, or drainage changes.

The Blueprint EA evaluated fire risks in its discussion of hazards. It discussed the potential for lithium-ion batteries to overheat and ignite but also concluded that the risk is increased in the case of poor packaging, damage, or exposure to a fire or other heat source. When packaged and handled properly, lithium-ion batteries pose no environmental hazard. Additionally, existing methods and recommendations exist for battery system performance to ensure that a single point fault will not result in fire or explosion. The Community Air Protection Blueprint would not result in a significant cumulative impact related to wildfire.

The Proposed Regulation would not exacerbate wildfire risks related to existing fire safety provisions and compliance with the California Department of Forestry and Fire Protection,

the California Public Utilities Commission, and California Fire Code regulations for facilities related to manufacturing facilities and battery production/recycling. Thus, the Proposed Regulation would **not result in a cumulatively considerable contribution** to wildfire impacts.

D. Growth-Inducing Impacts

A project would be considered growth-inducing if it removes an obstacle to growth, includes construction of new housing, or establishes major new employment opportunities. The reasonably foreseeable compliance responses associated with the Proposed Regulation would not directly result in any growth in population or housing, as the Proposed Regulation is meant to spur emissions-reducing changes in the existing fleet of locomotives operating in California, which would not require substantial relocation of employees.

VI. Mandatory Findings of Significance

Consistent with the requirements of CEQA Guidelines Section 15065 and Section 18 of the Environmental Checklist, this Draft EA addresses the mandatory findings of significance for the Proposed Regulation.

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, substantially 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?

A finding of significance is required if a project "has the potential to substantially degrade the quality of the environment" (14 CCR Section 15065[a]). In practice, this is the same standard as a significant effect on the environment, which is defined 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" (14 CCR Section 15382). 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 location, their areal 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. For projects within California, 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 when the projects are proposed for implementation. Outside of California, other state and local agencies would consider the proposed projects in accordance with their laws and regulations. CARB would not be the agency responsible for conducting the project-specific environmental or approval reviews because it is not the agency with authority for making land use or project implementation decisions.

This Draft EA addresses and discloses potential environmental effects associated with implementation of the Proposed Regulation, including direct, indirect, and cumulative impacts. As described in Chapter 4, this Draft EA discloses potential environmental impacts, the level of significance prior to mitigation, related mitigation measures, and the level of significance after the incorporation of mitigation measures.

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

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 (14 CCR Section 15065). "Cumulatively considerable" means "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" (14 CCR Section 15065[a][3]). Cumulative impacts are discussed in Chapter 5 of this Draft EA.

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

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 (14 CCR Section 15065[a][4]). Under this standard, a change to the physical environment that might otherwise be minor must be treated as significant if people would be significantly affected. This factor relates to adverse changes to the environment of human beings generally and not to 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 are air quality, geology and soils, hazards and hazardous materials, hydrology and water quality, noise, population and housing, public services, transportation, and utilities, which are all addressed in Chapter 4, "Impact Analysis and Mitigation Measures," of this Draft EA.

VII. Alternatives Analysis

This chapter provides an overview of the regulatory requirements and guidance for alternatives analyses under CEQA; a description of each of the alternatives to the Proposed Regulation; a discussion of whether and how each alternative meets the objectives of the Proposed Regulation; and an analysis of each alternative's environmental impacts.

A. Approach to Alternatives Analysis

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

The certified regulatory program provides general guidance that any action or proposal for which significant adverse environmental impacts have been identified during the review process shall not be approved or adopted as proposed if there are feasible mitigation measures or feasible alternatives available that would substantially reduce such an adverse impact. For purposes of this section, "feasible" means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors, and consistent with the Board's legislatively mandated responsibilities and duties (Title 14 CCR Section 15364).

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

Alternatives considered in an environmental document should be potentially feasible and should attain most of the basic project objectives. It is critical that the alternatives analysis define the project's objectives. The project objectives are listed below in Section C of this chapter.

The range of alternatives is governed by the "rule of reason," which requires evaluation of only those alternatives "necessary to permit a reasoned choice" (Title 14 CCR Section 15126.6[f]). Further, an agency "need not consider an alternative whose effect cannot be

reasonably ascertained and whose implementation is remote and speculative" (Title 14 CCR Section 15126.6[f][3]). The analysis should focus on alternatives that are feasible and that take economic, environmental, social, and technological factors into account. Alternatives that are remote or speculative need not be discussed. Furthermore, the alternatives analyzed for a project should focus on reducing or avoiding significant environmental impacts associated with the project as proposed.

B. Selection of Range of Alternatives

This chapter evaluates a range of alternatives to the Proposed Regulation that could reduce or eliminate significant effects on the environment while still meeting basic project objectives (14 CCR Section 15126.6[a]). Pursuant to CARB's certified regulatory program, this chapter also contains an analysis of each alternative's feasibility and the likelihood that it would substantially reduce any significant adverse environmental impacts identified in the impact analysis contained in Chapter 4 of this Draft EA (17 CCR Section 60004.2[a][5]).

CARB has identified a range of alternatives that allows the public and Board to consider different approaches. CARB has made a good-faith effort to identify potentially feasible project alternatives. For the purposes of this analysis, four alternatives were initially considered as follows:

- No-Project Alternative
- All Tier 4 Locomotives by 2030 (No Spending Account or no zero emission requirements)
- 35-Year Useful Life under the In-Use Operational Requirements
- All Tier 3 Locomotives by 2030 (No Spending Account or no zero emission requirements)

However, only the first three alternatives are analyzed in this EA. The "All Tier 3 locomotives by 2030" alternative was rejected from further consideration for reasons discussed below.

C. Project Objectives

The primary objectives of the Proposed Regulation are as follows:

1. Achieve reductions of particulate matter (PM), diesel particulate matter (diesel PM), oxides of nitrogen (NO_X), greenhouse gases (GHGs), and black carbon, from locomotives operating in California, to provide public health benefits throughout the state, and especially in communities near locomotive operations that are heavily burdened by freight pollution.

2. Minimize the operation of pre-Tier 4 locomotives in California to provide public health benefits throughout the state.

3. Assist in achieving CARB's proposed strategy to attain health-based federal air quality standards over the next 15 years as part of nonattainment area State Implementation Plans.

4. Reduce the state's dependence on petroleum as an energy resource and support the use of diversified fuels in the state's transportation fleet (Public Resources Code [PRC] Section 25000.5). In addition, using petroleum as an energy resource contributes substantially to the following public health and environmental problems: air pollution, acid rain, global warming, and the degradation of California's marine environment and fisheries (PRC Section 25000.5[b], [c]).

5. Decrease GHG emissions in support of statewide GHG reduction goals by limiting the use of internal combustion engine-powered locomotives, as identified in CARB's 2017 Climate Change Scoping Plan developed to reduce GHG emissions in California, as directed by Assembly Bill (AB) 32 (Nuñez, Chapter 488, Statutes of 2006). The Scoping Plan and the 2016 Mobile Source Strategy aim to accelerate development and deployment of the cleanest feasible mobile source technologies and to improve access to clean transportation. Implementation of the Proposed Regulation would also provide further GHG reductions pursuant to AB 1493 (Pavley, Ch. 200, Statutes of 2002).

6. Maintain and continue reductions in GHG emissions beyond 2020, in accordance with AB 32 (Health and Safety Code Sections 38551[b], 38562, 38562.5, 38566), and SB 32 (Health and Safety Code Section 38560–38566) and pursue measures that implement reduction strategies covering the state's GHG emissions in furtherance of California's mandate to reduce GHG emissions to the 1990 level by 2020 and 40 percent below the 1990 level by December 31, 2030.

7. Transition California's off-road sector to ZE technology as per requirements of Executive Order N-79-20.

8. Complement existing programs and plans to ensure, to the extent feasible, that activities undertaken pursuant to the measures complement, and do not interfere with, existing planning efforts to reduce GHG emissions, criteria pollutants, toxic air contaminant emissions (TAC), and the use of petroleum-based transportation fuels.

9. Achieve emission reductions that are real, permanent, quantifiable, verifiable, and enforceable (Health and Safety Code Sections 38560, 38562[d][1]).

10. Improve ZE technologies for locomotives and fueling infrastructure to guide the acceleration of the development of environmentally superior locomotives that will continue to deliver the performance, practicality, and safety demanded by the market.

11. Further the objectives set forth in AB 617 to support a reduction of emissions of TACs and criteria air pollutants in communities affected by a high cumulative exposure burden.

12. Take steps to ensure all Californians can live, work, and play in a healthful environment free from harmful exposure to air pollution. Protect and preserve public health and well-being, and prevent irritation to the senses, interference with visibility, and damage to vegetation and property (Health and Safety Code Section 43000[b]) in recognition that the emission of air pollutants from motor vehicles is the primary cause of air pollution in many parts of the state (Health and Safety Code Section 43000[a]).

D. Alternatives Analysis

Detailed descriptions and analyses of each of the three alternatives carried forward for analysis are presented below. The analysis of each alternative includes a discussion of the degree to which the alternative meets the basic project objectives, the degree to which the alternative avoids a potentially significant impact identified in Chapter 4, and any environmental impacts that may result from the alternative.

1. Alternative 1: No-Project Alternative

a) Alternative 1 Description

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

Under Alternative 1, the Proposed Regulation would not be implemented. There would be no requirement for locomotives operating in California to pay into a spending account for the emissions they contribute to California's air. Additionally, locomotives older than 23 years of age could continue to operate in California indefinitely. There would be no requirement for the transition of locomotive operation to ZE technologies. Locomotives could operate throughout the state without reporting operations to CARB. Locomotives would still be required to follow the federal 30-minute idling requirement.

b) Alternative 1 Discussion

1) Objectives

Alternative 1 would fail to meet the project objectives listed in Chapter 2 (and reproduced above). There would be no reductions in PM, diesel PM, NO_X, GHG, and TACs, meaning there would be no provided public health benefits. Alternative 1 would fail to move the locomotive market toward ZE, and it would not help to meet State Implementation Plan (SIP) goals. Alternative 1 also would not reduce the state's dependence on petroleum for energy or support the use of diversified fuels. Alternative 1 would not reduce GHG emissions in support of Assembly Bill (AB) 32 and Senate Bill (SB) 32. Alternative 1 also would not result in improvements to ZE technologies, nor would it lead the transition of California's off-road sector to ZE technology.

2) Environmental Impacts

Alternative 1 would result in no new environmental impacts because no compliance responses would occur. It is anticipated that Alternative 1 would not result in the manufacturing of new locomotives, creation of hydrogen plants or facilities that specialize in the production of batteries, or the modification or expansion of such facilities already in existence. Without an increased demand for precious metals required for the production of ZE technologies used for compliance with the Proposed Regulation, additional lithium mining activities also would not occur.

Without implementation of the Proposed Regulation, the beneficial impacts of compliance with the Proposed Regulation would not occur. There would be no reductions in PM or reductions that would provide public health benefits and meet SIP goals. Additionally, Alternative 1 would not decrease GHG emissions in support of AB 32 and SB 32. As described above, this alternative would fail to meet the basic project objectives, and the avoidance of construction-related environmental impacts realized by implementing Alternative 1 would not outweigh the overall environmental and health benefits of the Proposed Regulation.

2. Alternative 2: All Tier 4 Locomotives by 2030

a) Alternative 2 Description

Under Alternative 2, starting in 2023, all locomotive operators would need to deposit funds into a spending account. All funds held in the spending account would be exclusively used for the purchase, lease, remanufacture, repower, or rental of Tier 4 locomotives. Starting in 2030, only locomotives with an original engine build date less than 23 years old would be allowed to operate in California unless they are Tier 4. Idling requirements and reporting and recordkeeping requirements would remain the same as in the Proposed Regulation.

Alternative 2 would not include the ZE locomotive requirements found in the Proposed Regulation. By removing all ZE requirements, any construction-related environmental impacts related to ZE infrastructure would be eliminated from the project. Additionally, project-related activities associated with the manufacture of ZE locomotives operating on batteries or hydrogen fuel cells, such as increased lithium and platinum mining, would no longer occur.

b) Alternative 2 Discussion

i) Objectives

Alternative 2 would reduce emissions until natural growth in freight would require technologies cleaner than Tier 4 locomotives to achieve sustained emission reductions. Alternative 2 would reduce PM and NO_X from locomotives operating in California. However, the reductions would be less than those realized with the Proposed Regulation. It would also be consistent with SIP goals, but to a lesser extent than the Proposed Regulation. Alternative 2 also would not reduce the state's dependence on petroleum for energy or support the use of diversified fuels. This alternative would not reduce GHG emissions in support of AB 32 and SB 32 since Tier 4 locomotives have no GHG emission benefits compared to other locomotive tiers. This alternative would not result in improvements to ZE technologies, nor would it lead the transition of California's off-road sector to ZE technology.

1) Environmental Impacts

Alternative 2 would result in fewer environmental impacts compared to the Proposed Regulation because no compliance responses would result in the construction of infrastructure. It is anticipated that Alternative 2 would result in the manufacturing of new locomotives but would not result in the creation of ZE infrastructure, hydrogen production plants or fueling facilities, facilities that specialize in the production of batteries, or the modification or expansion of such facilities already in existence. Without the increased demand for precious metals required for the production of ZE technologies used for compliance with the Proposed Regulation, additional lithium and platinum mining activities also would not occur.

Without the ZE requirements of the Proposed Regulation, some beneficial impacts of compliance with the Proposed Regulation would not occur. Reductions in PM and NO_X under this alternative would be less than under the Proposed Regulation; therefore, this alternative would provide fewer public health benefits and would not help to meet SIP goals. Additionally, Alternative 2 would not decrease GHG emissions in support of AB 32 and SB 32. As described above, Alternative 2 would fail to meet most of the basic project objectives, and the environmental impacts realized by requiring only Tier 4 locomotives and not ZE locomotives would not achieve the same level of environmental and health benefits of the Proposed Regulation.

3. Alternative 3: 35-Year Useful Life under the In-Use Operational Requirements

a) Alternative 3 Description

Under Alternative 3, starting in 2030, all locomotives with an original engine build date of less than 35 years old could operate in California (compared to the Proposed Regulation's 23-year useful life). After a locomotive has reached a life of 35 years, it would no longer be allowed to operate in California unless it has been repowered to the cleanest locomotive as required by the Proposed Regulation. All other requirements of the Proposed Regulation would remain the same for this alternative. This alternative aligns with proposals from stakeholders advocating for a longer useful life for locomotives before California locomotive retirement is required.

b) Alternative 3 Discussion

i) Objectives

Alternative would reduce emissions at a slower rate than would the Proposed Regulation. It would reduce PM and NO_X from locomotives operating in California. However, the reductions would be less than those realized with the Proposed Regulation. Also, it would be consistent with SIP goals but to a lesser extent than the Proposed Regulation. Alternative 3 would reduce the state's dependence on petroleum for energy and support the use of diversified fuels by increasing the use of ZE locomotives but at a slower rate than would the Proposed Regulation. Although to a lesser extent than the Proposed Regulation, Alternative 3 would reduce GHG emissions in support of AB 32 and SB 32. By allowing locomotives to be 35 years old before requiring them to be retired from California service, this alternative would result in slower adoption of ZE technologies, slower improvements to ZE technologies, and a slower transition of California's off-road sector to ZE technology.

1) Environmental Impacts

The types of impacts under Alternative 3 would be the same as under the Proposed Regulation, including potentially significant adverse impacts related to aesthetics, agriculture and forestry resources, biological resources, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, mineral resources, noise, transportation, tribal cultural resources, and utilities and service systems. However, because many of the adverse environmental effects would be associated with manufacturing and new infrastructure, the degree of these impacts under Alternative 3 may occur later in time than they would under the Proposed Regulation. This is largely because the transition to ZE locomotives under Alternative 3 would be spread across several more years than under the Proposed Regulation. It is anticipated that Alternative 3 would result in the manufacturing of new locomotives but at a slower rate, and new manufacturing facilities may not be needed.

The adverse environmental impacts identified for the Proposed Regulation associated with manufacturing and mining activities would be less under Alternative 3 from 2030 and beyond given the timeline of transition under Alternative 3. These reduced impacts are in areas of biological resources, cultural resources, geology and soils, and hydrology and water quality, among others.

Delaying older locomotive turnover would result in reductions in PM and NO_X under this alternative that would be less than under the Proposed Regulation; therefore, this alternative would provide fewer public health benefits and would not help to meet SIP goals. Additionally, beneficial air quality, GHG, and energy effects would be anticipated to be less than those that would occur with implementation of the Proposed Regulation. Alternative 3 would result in fewer ZE locomotives being introduced from 2030 to 2050; therefore, fewer cumulative ZE locomotives would be on the road under the same timeframe as the Proposed Regulation. Alternative 3 would not avoid the impacts associated with the Proposed Regulation or achieve the same level of environmental benefit.

E. Alternatives Considered but Rejected

4. All Tier 3 Locomotives by 2030

This alternative was submitted to CARB by industry representatives. It is similar to Alternative 2 in that the regulation would not require ZE operation. This alternative would reduce PM and NO_X emissions compared to the existing conditions baseline and the No-Project Alternative. However, because Tier 3 does not reduce emissions to the same degree that Tier 4 engines or ZE technologies do, this alternative would fail to meet most of the project objectives (1, 2, 3, 4, 5, 6, 7, and 10). Emissions of PM and NO_X would not be reduced sufficiently to attain the national ambient air quality standards, nor would GHG emissions be reduced enough to assist the State in achieving its post-2020 GHG reduction targets. Compared to Alternative 2, which requires a transition to Tier 4 locomotives by 2030 but eliminates the ZE requirements under the Proposed Regulation, this alternative would not reduce emissions of PM and NO_X to the same degree because Tier 4 engines are vastly more advanced and capable of reducing emissions. Tier 4 engines reduce PM and NO_X emissions by an additional 70 percent compared with Tier 3 engines. Because Tier 3 engines are less equipped to reduce air pollutants compared to Tier 4 engines, which results in a failure to meet the majority of the Proposed Regulation's objectives, CARB staff did not pursue further evaluation of this alternative.