SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

South Coast AQMD

Final Program Environmental Impact Report

2016 AIR QUALITY MANAGEMENT PLAN

SCH #2016071006

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South Coast Air Quality Management District
(SCAQMD)

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Final Program Environmental Report for the 2016 AQMP

A correction to the Final Program Environmental Impact Report for the 2016 AQMP is shown below in underline text.

Page 6-27 (Section 6.4.5.1)

6.4.5.1 Proposed Project Impacts

Construction Impacts: Implementation of the proposed project control measures associated with air pollution control technologies and exhaust standards would not result in noise and vibration impacts because construction activities would occur within appropriately zoned industrial and commercial areas, impacts would be temporary and limited to construction activities, and construction noise/vibration impacts to sensitive receptors would not be expected. <u>However, transportation-related construction activities often occur during the evening/nighttime hours to minimize traffic impacts during the more heavy traffic periods. Therefore, the noise and vibration impacts during construction activities are considered significant.</u>

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PREFACE

This document constitutes the Final Program Environmental Impact Report (EIR) for the 2016 Air Quality Management Plan (AQMP). The Draft Program EIR was released for a 60-day public review and comment period from September 16, 2016 to November 15, 2016. It was concluded in the Draft Program EIR that the 2016 AQMP has the potential to generate significant adverse environmental impacts to the following environmental topic areas: aesthetics, construction air quality and GHG emissions, energy (increased electricity demand), hazards and hazardous materials, water demand, construction noise and vibration, solid waste, and transportation and traffic. Measures were identified to mitigate to the maximum extent feasible potentially significant adverse impacts to all environmental topics identified above. Despite implementation of all feasible mitigation measures, impacts to all environmental topic areas identified above remained significant. In addition, the Draft Program EIR: (1) included analyses of potentially significant adverse cumulative environmental impacts; (2) identified and evaluated the relative merits of four project alternatives, including a No Project Alternative; and (3) compared impacts from the project alternatives to the potential impacts from the 2016 AQMP. Eleven comment letters were received from the public during the public comment period regarding the environmental analyses in the Draft Program EIR. These comment letters and the responses to individual comments are included in Appendix E of this document. No comments in these letters identified other potentially significant adverse environmental impacts from the proposed project not already analyzed in the Draft Program EIR.

Since the proposed project was determined to have statewide, regional or areawide significance, a CEQA scoping was required pursuant to Public Resources Code §21083.9 (a)(2). Two CEQA scoping meetings were held on each of the following dates at various locations throughout the District: July 14, 2016, July 20, 2016, and July 21, 2016. No CEQA comments were raised at any of the CEQA scoping meetings.

Modifications to the proposed project were made between the release of the Draft 2016 AQMP (released to the public on June 30, 2016) and the Revised Draft 2016 AQMP (released to the public on October 7, 2016). The specific changes are documented in the following online overview: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/revised-draft-aqmp-plan/overview.pdf.
Several additional modifications to the proposed project were made between the release of the Revised Draft 2016 AQMP and the Draft Final AQMP (released to the public on December 2, 2016), including the addition of prioritized funding distribution to benefit disadvantaged communities, the addition of the latest emission reductions based on the latest attainment modeling, updates to Chapter 2 to reflect public health comments received on Appendix I, additional consideration of "life cycle" emissions analysis, clarification of engine inventory and acknowledgement of the need for reliable emergency power in certain circumstances (CMB-01), highlighting of the small wastewater treatment inventory among non-refinery flare facilities (CMB-03), an expanded discussion of RECLAIM re-assessment (CMB-05), clarification of the review of NPDES permits to avoid conflicting requirements (BCM-03), and the addition of the incentive funding shortfall procedure in Appendix IV-B. None of the above modifications caused additional significant adverse environmental impacts from the proposed project not already analyzed in the Draft Program EIR.

To facilitate identifying changes in this Final Program EIR, modifications to the document are included as underlined text and text removed from the document is indicated by ~~strikethrough~~. To avoid confusion, minor formatting changes are not shown in underline or strikethrough mode. Staff has reviewed the modifications to the proposed project and concluded that none of the modifications alter any conclusions reached in the Draft Program EIR nor provide new information of substantial importance relative to the draft document. As a result, none of the revisions to the Draft Program EIR reflected in this document require recirculation of the document pursuant to CEQA Guidelines section 15088.5. Therefore, this document now constitutes the Final Program EIR for the 2016 AQMP.

CHAPTER 1

INTRODUCTION AND EXECUTIVE SUMMARY

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1.2 California Environmental Quality Act
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1.0 INTRODUCTION AND EXECUTIVE SUMMARY

1.1 INTRODUCTION

The California Legislature adopted the Lewis Air Quality Act in 1976, creating the South Coast Air Quality Management District (SCAQMD) from a voluntary association of air pollution control districts in Los Angeles, Orange, Riverside, and San Bernardino counties. The new agency was charged with developing uniform plans and programs for the South Coast Air Basin (Basin) to attain federal air quality standards by the dates specified in federal law. While the Basin has one of the worst air quality problems in the nation, there have been significant improvements in air quality in the Basin over the last two decades, although some air quality standards are still exceeded relatively frequently, and by a wide margin. The SCAQMD was also required to meet state standards by the earliest date achievable through the use of reasonably available control measures.

The Lewis Air Quality Act (now known as the Lewis-Presley Air Quality Management Act) requires that the SCAQMD prepare an Air Quality Management Plan (AQMP) consistent with federal planning requirements. In 1977, amendments to the federal Clean Air Act (CAA) included requirements for submitting State Implementation Plans (SIPs) for non-attainment areas that fail to meet all federal ambient air quality standards (standards) (Health & Safety Code (H&S) §40462). The federal CAA was amended in 1990 to specify attainment dates and SIP requirements for ozone, carbon monoxide (CO), nitrogen dioxide (NO2) and particulate matter less than 10 microns in diameter (PM10). The California Clean Air Act (CCAA), adopted in 1988, requires the SCAQMD to endeavor to achieve and maintain state ambient air quality standards for ozone, CO, sulfur dioxide (SO2), and NO2 by the earliest practicable date (H&S §40910), and establish requirements to update the plan periodically.

The first AQMP was prepared and approved by SCAQMD in 1979. The 2016 AQMP will be the eleventh plan prepared by SCAQMD, not including certain SIPs for specific pollutants, e.g., PM10 for the Coachella Valley and the Basin, and CO and lead for Los Angeles County. The following bullets summarize the main components of the past AQMP updates and revisions:

- The 1982 AQMP was revised to reflect better data and modeling tools.

- In 1987, a federal court ordered the U.S. Environmental Protection Agency (EPA) to disapprove the 1982 AQMP because it did not demonstrate attainment of all federal standards by 1987 as required by the CAA. This, in part, led to the preparation of the 1989 AQMP.

- The 1989 AQMP was adopted on March 17, 1989 and was specifically designed to attain all federal standards. This plan called for three “tiers” of measures as needed to attain all standards and relied on significant future technology advancement to attain these standards.

- In 1991, the SCAQMD prepared and adopted the 1991 AQMP to comply with the CCAA.

- In 1992, the 1991 AQMP was amended to add a control measure containing market-based incentive programs (subsequently SCAQMD's Regional Clean Air Incentives Market (RECLAIM)).

- In 1994, the SCAQMD prepared and adopted the 1994 AQMP to comply with the CCAA three-year update requirement and to meet the federal CAA requirement for an ozone SIP. The AQMP, as adopted in 1994, included the following:

  - ❑ All geographical areas under the jurisdiction of the SCAQMD, compared to just the Basin;
  - ❑ The basic control strategies remained the same as in the earlier plans, although the three-tiered structure of control measures was replaced and measures previously referred to as Tier I, II, or III were replaced with short-/intermediate-term or long-term control measures;
  - ❑ Updated and refined control measures carried over from 1991;
  - ❑ Best Available Control Measure PM10 Plan;
  - ❑ The ozone attainment demonstration plan;
  - ❑ Amendments to the federal Reactive Organic Compound Rate-of-Progress Plan (also referred to as the VOC Rate-of-Progress Plan); and
  - ❑ Attainment Demonstration Plans for the federal PM10, NO2, and CO air quality standards; etc.

- The 1997 AQMP was designed to comply with the three-year update requirements specified in the CCAA as well as to include an attainment demonstration for PM10 as required by the federal CAA. Relative to ozone, the 1997 AQMP contained the following changes to the control strategies compared to the 1994 AQMP:

  - ❑ Less reliance on transportation control measures (TCMs);
  - ❑ Less reliance on long-term control measures that rely on future technologies as allowed under §182(e)(5) of the CAA; and
  - ❑ Removal of other infeasible control measures and indirect source measures that had been substantially impacted by the state legislature in enacting new provisions in the Health and Safety Code.

- In 1999, the ozone plan portion of the 1997 AQMP was amended to address partial disapproval of the 1997 AQMP by the U.S. EPA and a settlement of litigation by environmental groups challenging the 1997 AQMP to provide the following:

  - ❑ Greater emission reductions in the near-term than would occur under the 1997 AQMP;
  - ❑ Early adoption of the measures that would otherwise be contained in the next three-year update of the AQMP; and
  - ❑ Additional flexibility relative to substituting new measures for infeasible measures and recognition of the relevance of cost effectiveness in determining feasibility.

- In April 2000, U.S. EPA approved the 1999 ozone SIP to the 1997 plan. The 1999 Amendment in part addressed the state's requirements for a triennial plan update.

- The 2003 AQMP was approved and adopted by the SCAQMD in August 2003. The 2003 AQMP was partially approved and partially disapproved by U.S. EPA, based on CARB's withdrawal of mobile source measures after the 1-hour ozone standard was revoked. The 2003 AQMP addressed the following control strategies:

  - Attaining the federal PM10 ambient air quality standard for the Basin and Coachella Valley - these portions were approved by the U.S. EPA: in both areas, the attainment demonstration was disapproved after CARB withdrew its measures;
  - Attaining the federal 1-hour ozone standard;
  - 1997/1999 control measures not yet implemented;
  - Revisions to the Post 1996 VOC Rate-of-Progress Plan and SIP for CO; and
  - Initial analysis of emission reductions necessary to attain the PM2.5 and 8-hour ozone standards.

- The SCAQMD Governing Board approved the 2007 AQMP for both ozone and PM10 on June 1, 2007. On September 27, 2007, CARB adopted the State Strategy for the 2007 SIP and the 2007 AQMP as part of the SIP. The 2007 SIP was then forwarded to U.S. EPA for approval. The following summarizes the major components of the 2007 AQMP:

  - The most current air quality setting at the time (i.e., 2005 data);
  - Updated emission inventories using 2002 as the base year, which also incorporated measures adopted since adopting the 2003 AQMP;
  - Updated emission inventories of stationary and mobile on-road and off-road sources;
  - 2003 AQMP control measures not yet implemented (eight of the control measures originally contained in the 2003 AQMP were updated or revised for inclusion into the 2007 AQMP);
  - 24 new measures were incorporated into the 2007 AQMP based on replacing the SCAQMD's long-term control measures from the 2003 AQMP with more defined or new control measures and control measure adoption and implementation schedules;
  - SCAQMD's recommended control measures to reduce emissions from sources that are primarily under state and federal jurisdiction, including on-road and off-road mobile sources, and consumer products;
  - Southern California Association of Governments (SCAG)'s regional transportation strategy and control measures; and
  - Analysis of emission reductions necessary and attainment demonstrations to achieve the federal 8-hour ozone and PM2.5 air quality standards.

- On November 22, 2010, U.S. EPA issued a notice of proposed partial approval and partial disapproval of the 2007 South Coast SIP for the 1997 Fine Particulate Matter Standards and the corresponding 2007 State Strategy. Specifically, U.S. EPA proposed approving the SIP's inventory and regional modeling analyses, but it also proposed disapproving the attainment demonstration because it relied too extensively on commitments to emission reductions in lieu of fully adopted, submitted, and SIP-approved rules. The notice also cited deficiencies in the SIP's contingency measures.

- In response to U.S. EPA's proposed partial disapproval of the 2007 SIP, on March 4, 2011, the SCAQMD Governing Board approved Revisions to the 2007 PM2.5 and Ozone SIP for the Basin and Coachella Valley. The revisions to the 2007 PM2.5 and Ozone SIP consisted of the following:

  - ❑ Updated implementation status of SCAQMD control measures necessary to meet the 2015 PM2.5 attainment date;
  - ❑ Revisions to the control measure adoption schedule;
  - ❑ Changes to the emission inventory resulting from CARB's December 2010 revisions to the on-road truck and off-road equipment rules; and
  - ❑ An SCAQMD commitment to its "fair share" of additional NOx emission reductions, if needed, in the event U.S. EPA does not voluntarily accept the "federal assignment."

- In response to the July 14, 2011 U.S. EPA notice of proposed partial approval and partial disapproval of the 2007 South Coast SIP for the 1997 Fine Particulate Matter Standards, at the October 7, 2011 public hearing, the SCAQMD Governing Board approved Further Revisions to PM2.5 and Ozone SIP for the Basin and Coachella Valley. Revisions to the PM2.5 SIP included a three-prong approach for identifying contingency measures needed to address U.S. EPA's partial disapproval:

  - ❑ Equivalent emissions reductions achieved through improvements in air quality;
  - ❑ Relying on committed emissions reductions for the 2007 ozone plan; and
  - ❑ Quantifying excess emissions reductions achieved by existing rules and programs that were not originally included in the 2007 PM2.5 SIP.

- U.S. EPA fully approved the 2007 SIP for the 8-hour ozone standard on March 1, 2012.

- The SCAQMD Governing Board approved the 2012 AQMP on December 7, 2012. The 2012 AQMP was primarily designed to demonstrate attainment of the 2006 24-hour PM2.5 standard (35 ug/m3). The adopted Final 2012 AQMP was forwarded to CARB on December 20, 2012, with subsequent approval at its January 23, 2013, Board meeting. On February 1, 2013, the SCAQMD Governing Board approved Control Measure IND-01, Backstop Measure for Indirect Sources of Emissions from Ports and Port-Related Facilities, for inclusion in the Final 2012 AQMP. The following summarizes the major components of the 2012 AQMP:

  - ❑ The most current science and analytical tools;

- A comprehensive strategy aimed at controlling pollution from stationary (point) sources, on-road and off-road mobile sources, and area sources;
- Attainment demonstration of the federal 24-hour PM2.5 standard by 2014 in the Basin through adoption of control measures;
- Update of the U.S. EPA approved 8-hour ozone control plan with new measures designed to reduce reliance on the CAA Section 182 (e)(5) long-term measures for NOx and VOC reductions;
- Address several state and federal planning requirements, incorporating new scientific information, primarily in the form of updated emissions inventories, ambient measurements, and new meteorological air quality models;
- Update on the air quality status of the SSAB in the Coachella Valley;
- Discussion of the emerging issues of ultrafine particles and near-roadway exposures;
- Analysis of the energy supply and demand issues that face the Basin and their relationship to air quality;
- Demonstrations of 1-hour ozone attainment and vehicle miles travelled (VMT) emissions offsets, as per U.S. EPA requirements based on the recent court case of Association of Irritated Residents (AIR) vs. U.S. EPA (2012); and
- Specific measures to further implement the ozone strategy in the 2007 AQMP.

- A Supplement to the 24-Hour PM2.5 (35 ug/m3) SIP was approved by the SCAQMD Governing Board on February 6, 2015. The purpose of the Supplement was to demonstrate attainment of the 2006 24-hour PM2.5 NAAQS by 2015 under the CAA (Title 1, Part D, Subpart 4) that had been required based on a recent court case. This plan included a discussion of the effects of the drought on the attainment date. New transportation conformity budgets for 2015 were also developed.

- The SCAQMD requested and received in January 2016 from the U.S. EPA a redesignation of the 24-hour PM2.5 standard to "serious" non-attainment area with a new attainment deadline of 2019.

- On April 14, 2016, U.S. EPA partially approved and partially disapproved the 2012/2015 PM2.5 and 2015 Supplement Plans. The U.S. EPA approved the following elements of the Plan: Emission inventories; demonstration that the Basin cannot practicably attain by the Moderate area attainment date of December 31, 2015; the control strategy commitments; and the general conformity budgets. The U.S. EPA did not approve the following portions of the Plan: The demonstration that the Plan provides for the implementation of reasonably available control measures and reasonably available control technology due to deficiencies in the 2010 version of the area's RECLAIM included in the Plan; and the demonstration that the Plan provides for reasonably further progress. Furthermore, the U.S. EPA did not act on the motor vehicle emission budgets or the ports backstop measure.

- On August 24, 2016, the U.S. EPA released the final PM2.5 implementation rule that established PM2.5 planning requirements for states with areas that do not meet the NAAQS for PM2.5. This rule establishes plan requirements for plan due dates, attainment dates, emission inventories, attainment demonstrations, provisions for demonstrating reasonable further progress, milestones, contingency measures, and new source review requirements. It also responds to a January 2103 court decision of EPA's previous PM2.5 standards.

1.2 CALIFORNIA ENVIRONMENTAL QUALITY ACT

Pursuant to the California Environmental Quality Act (CEQA), this Program Environmental Impact Report (EIR) has been prepared to address the potential environmental impacts associated with the SCAQMD's Draft 2016 AQMP. The 2016 AQMP is the planning document that sets forth policies and measures to achieve federal and state air quality standards in the region. CEQA Public Resources Code §21000 et seq., requires that the potential environmental impacts of proposed projects be evaluated and that feasible methods to reduce or avoid identified significant adverse environmental impact from these projects be identified.

To fulfill the purpose and intent of CEQA, the SCAQMD staff has prepared this Program EIR to address the potential environmental impacts associated with the 2016 AQMP. Prior to making a decision on the 2016 AQMP, the lead agency decision makers must review and certify the Program EIR as providing adequate information on the potential adverse environmental impacts of the 2016 AQMP.

1.2.1 NOTICE OF PREPARATION/INITIAL STUDY

The original Notice of Preparation and Initial Study (NOP/IS, Appendix A) were distributed to responsible agencies and interested parties for a 30-day review and comment period on June 30, 2016. The Initial Study identified potential adverse impacts in the following environmental topics: air quality and greenhouse gas (GHG) emissions; energy; hazards and hazardous materials; hydrology and water quality; noise; solid/hazardous waste; and transportation and traffic. Further evaluation of aesthetic impacts was determined to also be necessary in the Program EIR. The Program EIR also includes comments and responses to comment letters received on the NOP/IS (Appendix B).

1.2.2 EIR FORMAT

The overall format of the EIR is as follows:

Executive Summary

Chapter 1: Introduction

Chapter 2: Project Description

Chapter 3: Existing Environmental Setting

Chapter 4: Environmental Impacts and Mitigation Measures

Chapter 5: Cumulative Impacts

Chapter 6: Alternatives

Chapter 7: References

Chapter 8: Acronyms

1.3 EXECUTIVE SUMMARY: CHAPTER 2 – PROJECT DESCRIPTION

Implementation of the 2016 AQMP control strategies requires a cooperative partnership of governmental agencies at the federal, state, regional and local level. At the federal level, the U.S. EPA is charged with regulation of on-road motor vehicle standards; trains, airplanes, and ships; certain non-road engines; and off-shore oil development. CARB also oversees on-road emission standards, fuel specifications, some off-road sources and consumer product standards. At the regional level, SCAQMD is responsible for stationary sources and some mobile sources. In addition, SCAQMD has lead responsibility for the development of the AQMP. Furthermore, at the local level, the Southern California Association of Governments (SCAG) has a dual role of leader and coordinator. In their leadership role, they, in cooperation with local jurisdictions and sub-regional associations, develop strategies for these jurisdictions to implement. As a coordinator, they facilitate the implementation of these strategies (i.e., transportation control measures).

Chapter 2 describes existing air quality regulations and details the proposed approach for the 2016 AQMP.

1.3.1 CURRENT CONTROL STRATEGY

The ozone portion of the 2007 AQMP has been approved by the U.S. EPA into the SIP. Certain of the “moderate” 24-hour PM2.5 elements of the 2012 AQMP have also been approved by the U.S. EPA, and in January 2016 the U.S. EPA approved the Basin’s re-designation as a “serious” nonattainment area for PM2.5. SCAQMD continues to implement the 2012 AQMP, which received a limited approval and limited disapproval by U.S. EPA on April 14, 2016. For the control measures adopted by SCAQMD over this period, 11.7 tons per day of PM2.5 reductions were achieved by 2014 and 2.4 tons per day of VOC reductions and 19.5 tons per day of NOx reductions will be achieved by 2023.

1.3.2 2016 AQMP CONTROL STRATEGY

The overall control strategy for the 2016 AQMP is designed to meet applicable federal and state requirements. The 2016 AQMP focuses on NOx reductions to attain ozone and PM2.5 standards, both federal and state. In addition, the 2016 AQMP also discusses the recently adopted federal 8-hour ozone standard (70 ppb). The proposed control measures in the 2016 AQMP are based on implementing all feasible control measures through the accelerated deployment of available cleaner technologies, best management practices, co-benefits from existing programs, and incentive measures. Public and private funding will help to further the development and deployment of advanced technologies. Similar to the approaches taken in previous AQMPs, the SIP commitment includes an adoption and implementation schedule for each control measure. Many of the same technologies will address both air quality and climate needs, such as increased energy efficiency. To ultimately achieve the ozone ambient air quality standards and demonstrate attainment, significant NOx emissions reductions will be necessary, not only from non-vehicular sources under the jurisdiction of SCAQMD, but substantial reductions will be necessary from sources primarily under the jurisdiction of CARB (e.g., on-road motor vehicles, off-road equipment, and consumer products) and U.S. EPA (e.g., aircraft, ships, trains, and pre-empted off-road equipment). Without an adequate and fair-share level of reductions from all sources, the emissions reduction burden would be unfairly shifted to stationary sources that are already stringently regulated. SCAQMD will continue to work closely with CARB to further control mobile source emissions where federal or state actions do not meet regional needs.

Implementation of the 2016 AQMP will be based on a series of control measures and strategies that vary by source type (i.e., mobile or stationary) as well as by the pollutant that is being addressed. Control measures were developed from a number of sources, including the AQMP Advisory Group, AQMP Control Strategy Symposium, Reasonably Available Control Technology (RACT) / Reasonable Available Control Measures Analysis (RACM), Best Available Control Technology (BACT) / Best Available Control Measures (BACM) analysis, (2016 AQMP, Appendix VI), SCAQMD staff and public input, and previous AQMPs.

The 2016 AQMP control measures consist of three main components: 1) the SCAQMD's Stationary and Mobile Source Control Measures; 2) suggested State and Federal Source Control Measures; and 3) RTP/SCS <u>Transportation</u> Control Measures provided by SCAG. These measures rely on not only the traditional command-and-control approach, but also public incentive programs, as well as advanced technologies expected to be developed and deployed in the next several years. See subchapter 2.8 of the Program EIR for a full description of all of the 2016 AQMP control measures.

1.4 EXECUTIVE SUMMARY: CHAPTER 3 – EXISTING ENVIRONMENTAL SETTING

Chapter 3 provides a detailed description of the existing setting of environmental resources identified as having potential significant impacts from the 2016 AQMP.

1.4.1 AIR QUALITY AND GREENHOUSE GASES

It is the responsibility of SCAQMD to ensure that state and federal standards are achieved and maintained in its geographical jurisdiction. Health-based air quality standards have been established by California and the federal government for the following criteria air pollutants: ozone, CO, NO_2, PM10, PM2.5, SO_2, and lead. These standards were established to protect sensitive receptors with a margin of safety from adverse health impacts due to exposure to air pollution. The California standards are more stringent than the federal standards and in the case of PM10 and SO_2, far more stringent. California has also established standards for sulfates, visibility reducing particles, hydrogen sulfide, and vinyl chloride.

SCAQMD also has a general responsibility pursuant to H&S §41700 to control emissions of air contaminants and prevent endangerment to public health. Additionally, state law requires SCAQMD to implement airborne toxic control measures (ATCM) adopted by CARB, and to implement the Air Toxics "Hot Spots" Act. As a result, SCAQMD has regulated pollutants other than criteria pollutants such as TACs, GHG, and stratospheric ozone depleting compounds. SCAQMD has developed a number of rules to control non-criteria pollutants from both new and existing sources. These rules originated through state directives, CAA requirements, or the SCAQMD rulemaking process.

Two inventories are prepared for the 2016 AQMP for the purpose of regulatory and SIP performance tracking and transportation conformity: an annual average inventory, and a summer planning inventory. Baseline emissions data presented in this chapter are based on average annual day emissions (e.g., total annual emissions divided by 365 days) and seasonally adjusted summer planning inventory emissions. The 2016 AQMP uses annual average day emissions to estimate the cost-effectiveness of control measures, to rank control measure implementation, and to perform PM2.5 modeling and analysis. The summer planning inventory emissions are developed to capture the emission levels during a poor ozone air quality season, and are used to report emission reduction progress as required by the federal and California CAAs.

Stationary sources can be divided into two major subcategories: point and area sources. Point sources are large emitters with one or more emission sources at a permitted facility with an identified location (e.g., power plants, refineries). Area sources consist of many small emission sources (e.g., residential water heaters, architectural coatings, consumer products, as well as, permitted smaller sources), which are distributed across the region. The emissions from these sources are estimated using activity information and emission factors.

Mobile sources consist of two subcategories: on-road and off-road sources. On-road sources are from vehicles that are licensed to drive on public roads. Off-road sources are typically registered with the state and cannot be typically driven on public roads (construction & mining equipment, lawn & gardening equipment, ground support equipment, agricultural equipment).

In the 2012 base year model of the 2016 AQMP, total mobile source emissions account for 28 percent of the VOC and 87 percent of the NOx emissions based on the summer planning inventory. The on-road mobile category alone contributes about 33 and 56 percent of the VOC and NOx emissions, respectively, and approximately 63 percent of the CO for the annual average inventory. For directly emitted PM2.5, mobile sources represent 22 percent of the emissions with another 13 percent due to vehicle-related entrained road dust.

Demographic growth forecasts for various socioeconomic categories (e.g., population, housing, employment by industry), developed by SCAG for the 2016 RTP/SCS, were used. Industry growth factors for 2012, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2025, 2026, 2031, and 2037 were also provided by SCAG, and interim years were calculated by linear interpolation. Current forecasts indicate that this region will experience a population growth of 7 percent between 2008 and 2023, with a seven percent increase in vehicle miles traveled (VMT); and a population growth of 12 percent by the year 2031 with an eight percent increase in VMT.

Without any additional controls, VOC and NOx, emissions are expected to decrease due to existing regulations, such as controls on off-road equipment, new vehicle standards, and the RECLAIM programs. However, emissions of SOx and PM2.5 show an increase after 2022, when most of the rules and regulations will be fully implemented. Emission increases due to increases in population and activity outpace the emission reductions from introducing newer and cleaner equipment and vehicles. Due to already-adopted regulations, 2023 on-road mobile sources are expected to account for: about 14 percent of total VOC emissions compared to 33 percent in 2012; about 30 percent of total NOx emissions compared to 56 percent in 2012; and about 26 percent of total CO emissions compared to 63 percent in 2012. Meanwhile, area sources are expected to become the major contributor to VOC emissions from 37 percent in 2012 to 54 percent in 2031.

Inventories were developed for 2012, 2019, 2022, 2023, 2025, and 2031. 2012 is the base-year for the attainment demonstrations. 2023 and 2031 are the attainment years for the federal 8-hour ozone standards of 80 ppb (revoked) and 75 ppb, respectively. The 2022 inventory was developed to show attainment for the revoked 1-hour ozone standard (120 ppb). The 2019 and 2025 inventories were used to demonstrate attainment for the federal 24-hour and annual PM2.5 standards, respectively.

1.4.2 ENERGY

Federal and state agencies regulate energy use and consumption through various means and programs. On the federal level, the United States Department of Transportation (U.S. DOT), United States Department of Energy (U.S. DOE), and U.S. EPA are three agencies with substantial influence over energy policies and programs. Generally, federal agencies influence transportation energy consumption through establishment and enforcement of fuel economy standards for automobiles and light trucks, through funding of energy related research and development projects, and through funding for transportation infrastructure projects.

On the state level, the California Public Utilities Commission (CPUC) and California Energy Commission (CEC) are two agencies with authority over different aspects of energy policy and regulations. The CPUC regulates privately-owned utilities in the energy, rail, passenger transportation, telecommunications, and water fields. The CEC collects and analyzes energy-related data, prepares state-wide energy policy recommendations and plans, promotes and funds energy efficiency and renewable energy resources programs, plans and directs state response to energy emergencies, and regulates the power plant siting and transmission process.

In 2014, 67 percent of the electricity used in California came from in-state sources, while 33 percent was imported into the state. The electricity imported totaled 97,870 gigawatt hours (GWh), with 37,261 GWh coming from the Pacific Northwest, and 60,609 GWh from the Southwest. (Note: A gigawatt is equal to one million kilowatts). For natural gas in 2013, 38 percent of the natural gas used in California came from the Southwest, 16 percent from Canada, 10 percent from in-state, and 36 percent from the Rockies. Also in 2014, 38 percent of the crude oil came from in state, with 10 percent coming from Alaska, and 52 percent being supplied by foreign sources.

One of the key areas of concern in the energy sector is reducing the amount of petroleum based fuels in the Basin. Consumption of these fuels is a major factor in the amount of criteria pollutants in southern California. Alternative fuels play an important role in the strategy to reach attainment in the region. Renewable energy resources include: biomass, hydroelectric, geothermal, solar, and wind.

1.4.3 HAZARDS AND HAZARDOUS MATERIALS

The potential for hazards exist in the production, use, storage, and transportation of hazardous materials. Hazardous materials may be found at industrial production and processing facilities. Some facilities produce hazardous materials as their end product, while others use such materials as an input to their production process. Examples of hazardous materials used as consumer products include gasoline, solvents, and coatings/paints. Hazardous materials are stored at facilities that produce such materials and at facilities where hazardous materials are a part of the production process. Specifically, storage refers to the bulk handling of hazardous materials before and after they are transported to the general geographical area of use. Currently, hazardous materials are transported throughout the district via all modes of transportation including rail, highway, water, air, and pipeline.

Hazard concerns are related to the risks of explosions or the release of hazardous substances or exposure to air toxics. State law requires detailed planning to ensure that hazardous materials are properly handled, used, stored, and disposed of to prevent or mitigate injury to health or the environment in the event that such materials are accidentally released. Federal laws, such as the Emergency Planning and Community-Right-To-Know Act of 1986 (also known as Title III of the Superfund Amendments and Reauthorization Act or SARA) impose similar requirements. These requirements are enforced by the California Emergency Management Agency (CalEMA).

In 2012, there were a total of 872 hazardous materials incidents (releases, accidents, spills, etc.) reported for Los Angeles, Orange, Riverside and San Bernardino counties, in 2013 a total of 791 incidents were reported in these four counties, and in 2014 a total of 776 incidents were reported across the four counties. Over this period, San Bernardino and Los Angeles counties accounted for the largest number of incidents, followed by Orange and Riverside counties.

1.4.4 HYDROLOGY AND WATER QUALITY

The Federal Safe Drinking Water Act, enacted in 1974 and implemented by the U.S. EPA, imposes water quality and infrastructure standards for potable water delivery systems nation-wide. The California Safe Drinking Water Act was enacted in 1976. Potable water supply is managed through local agencies and water districts, the State Department of Water Resources (DWR), the Department of Health Services (DHS), the State Water Resources Control Board (SWRCB), the U.S. EPA, and the U.S. Bureau of Reclamation. The DWR manages the State Water Project (SWP), and compiles planning information on supply and demand within the state.

The DWR divides the state into ten hydrologic regions. Some regions contain a great deal of water, some regions are very dry and must have their water imported by aqueducts. The Basin lies within the South Coast Hydrologic Region. More than half of the state's population resides in the region (about 19.6 million people or about 54 percent of the state's population), which covers 11,000 square miles or seven percent of the state's total land. The cities of Los Angeles, Long Beach, Santa Ana, San Bernardino, and Big Bear Lake are among the many urban areas in this section of the state. The Santa Clara, Los Angeles, San Gabriel, and Santa Ana Rivers are among the area's hydrologic features. Most lakes in this area are actually reservoirs, made to hold imported water.

Imported sources account for approximately 75 percent of the total water used in the region. Local water resources, which include groundwater and captured surface water runoff, are fully developed and are expected to remain relatively stable in the future on a region-wide basis. Several groundwater basins in the region are threatened by overdraft conditions, increasing levels of salinity, and contamination by agricultural land to urban development, thereby reducing the land surface available for groundwater recharge. Increasing demand for groundwater may also be limited by water quality, since levels of salinity in sources currently used for irrigation could be unacceptably high for domestic use without treatment.

The SWRCB, and the nine regional water quality control boards (RWQCB), are responsible for protecting surface and groundwater supplies in California. In particular, the SWRCB establishes water-related policies and approves water quality control plans, which are implemented and enforced by the RWQCBs. Five RWQCBs have jurisdiction over areas within the boundaries of the SCAQMD. These agencies also regulate discharges to state waters through federal pre-treatment requirements enforced by the publicly owned treatment works (POTWs).

Water quality of regional surface water and groundwater resources is affected by point source and non-point source discharges occurring throughout individual watersheds. Regulated point sources, such as wastewater treatment effluent discharges, usually involve a single discharge into receiving waters. Non-point sources involve diffuse and non-specific runoff that enters receiving waters through storm drains or from unimproved natural landscaping. Within the regional water basin plans, the RWQCBs establish water quality objectives for surface water and groundwater resources and designate beneficial uses for each identified waterbody.

Much of the urbanized areas of Los Angeles and Orange Counties are serviced by three large POTWs operating on the coast: the City of Los Angeles Bureau of Sanitation Hyperion Facility, the Joint Outfall System of the Los Angeles County Sanitation Districts (LACSD), and the Orange County Sanitation District (OCSD) treatment plant. These three facilities handle more than 70 percent of the wastewater generated in the entire region.

1.4.5 NOISE

The federal government sets noise standards for transportation-related noise sources that are closely linked to interstate commerce, such as aircraft, locomotives, and trucks, and, for those noise sources, the state government is preempted from establishing more stringent standards. The state government sets noise standards for those transportation noise sources that are not preempted from regulation, such as automobiles, light trucks, and motorcycles. Noise sources associated with industrial, commercial, and construction activities are generally subject to local control through noise ordinances and general plan policies.

Since environmental noise levels typically fluctuate across time of day, different types of noise descriptors are used to account for this variability and have been developed to differentiate between cumulative noise over a given period and single noise events. Individual noise events, such as train pass-bys or aircraft overflights, are further described using single-event and cumulative noise descriptors.

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. The Federal Transit Administration (FTA) states that in contrast to airborne noise, ground-borne vibration is not a common environmental problem and most people consider groundborne vibration to be an annoyance that may affect concentration or disturb sleep. However, high levels of vibration may damage fragile buildings or interfere with equipment that is highly sensitive to groundborne vibration (e.g., electron microscopes).

Some land uses (residences, schools, hospitals, etc.) are considered more sensitive to ambient noise levels than others due to the amount of noise exposure and the types of activities typically involved and are assigned more stringent noise standards. A noise level of 55 to 60 decibels outdoors is the upper limit for intelligible speech communication inside a typical home. In addition, social surveys and case studies have shown that complaints and community annoyance in residential areas begin to occur at about 55 decibels.

1.4.6 SOLID AND HAZARDOUS WASTE

A total of 32 Class III active landfills and two transformation facilities (i.e., waste-to-energy facilities) are located within the Basin with a total capacity of 112,592 tons per day and 3,240 tons per day, respectively. Permit requirements, capacity and surrounding land use are three of the dominant factors limiting the operations and life of landfills in the Basin. Landfills are permitted by the local enforcement agencies with concurrence from CalRecycle (formerly known as the California Integrated Waste Management Board). Local agencies establish the maximum amount of solid waste that can be received by a landfill each day, and the operational life of a landfill. Landfills are operated by both public and private entities. Landfills in the district are also subject to SCAQMD requirements as they pertain to gas collection systems, dust and nuisance impacts.

There are no hazardous waste disposal sites within the Basin. Hazardous waste generated at area facilities, which is not reused on-site, or recycled off-site is disposed of at a licensed in-state hazardous waste disposal facility. Two such facilities are the Chemical Waste Management (CWM) Kettleman Hills facility in King's County, and the Laidlaw Environmental Services (LES) facility in Buttonwillow (Kern County). Kettleman was permitted to increase its capacity by about five million cubic yards in May 2014. CMW applied to both the Department of Toxic Substances Control (DTSC) and the U.S. EPA to expand the facility to provide another 12-14 years of life. Buttonwillow receives approximately 900 tons of hazardous waste per day and has a remaining capacity of approximately 8,890,000 cubic yards. The expectant life of the Buttonwillow Landfill is approximately 40 years. Hazardous waste also can be transported to permitted facilities outside of California such as the U.S. Ecology Inc. facility in Beatty, Nevada or the LES facility in Lake Point, Utah.

While DTSC has primary responsibility in the state for regulating the generation, transfer, storage and disposal of hazardous materials, DTSC may further delegate enforcement authority to local jurisdictions. In addition, DTSC is responsible and/or provides oversight for contamination cleanup, and administers state-wide hazardous waste reduction programs. DTSC conducts annual inspections of hazardous waste facilities. Other inspections can occur on an as-needed basis.

California Department of Transportation (Caltrans) sets standards for trucks transporting hazardous wastes in California. The regulations are enforced by the California Highway Patrol (CHP). Trucks transporting hazardous wastes are required to maintain a hazardous waste manifest. The manifest is required to describe the contents of the material within the truck so that wastes can readily be identified in the event of a spill.

1.4.7 TRANSPORTATION AND TRAFFIC

The southern California transportation system is a complex intermodal network that consists of roads, highways, public transit, paratransit, bus, rail, airports, seaports and intermodal terminals designed to carry both people and goods. The transportation system supports the region's economic needs, as well as the demand for personal travel.

Numerous agencies are responsible for transportation planning and investment decisions within the southern California area. SCAG helps integrate the transportation-planning activities in the region to ensure a balanced, multimodal plan that meets regional as well as county, subregional, and local goals, while each of the four counties within the Basin has a Transportation Commission or Authority. These agencies are charged with countywide transportation planning activities, allocation of locally generated transportation revenues, and in some cases operation of transit services.

The existing transportation network serving the southern California area supports the movement of people and goods. On a typical weekday in the four-county region the transportation network supports a total of approximately 448 million VMT and 13 million vehicle hours of travel (VHT). Of this total, over half occurs in Los Angeles County.

Much of the existing travel in the southern California area takes place during periods of congestion, particularly during the morning (AM peak period, 6:00 AM to 9:00 AM) and evening peak periods (PM peak period, 3:00 PM to 7:00 PM). Congestion can be quantified as the amount of travel that takes place in delay (vehicle hours of delay or VHD), and alternately, as the percentage of all travel time that occurs in delay (defined as the travel time spent on the highway due to congestion, which is the difference between VHT at free-flow speeds and VHT at congested speeds). Regional travel time in delay represents approximately 24 percent of all daily, 25 percent of all AM peak period, and 25 percent of all PM peak period travel times.

The regional freeway and highway system is the primary means of person and freight movement for the region. This system provides for direct automobile, bus and truck access to employment, services and goods. The network of freeways and state highways serves as the backbone of the system offering very high capacity limited-access travel and serving as the primary heavy duty truck route system.

Transit use is growing in southern California. As of 2012, transit agencies in the southern California area reported 716 million annual boarding. This represents growth of 14 percent in the ten years between 2001 and 2012, but only three percent growth in per capita trips due to population growth. Metrolink saw annual ridership grow by 78 percent and Metro Rail (Los Angeles County) has seen annual ridership growth of 64 percent.

1.4.8 AESTHETICS

Aesthetic resources on federal lands are managed by the federal government using various visual resource management programs, such as the Visual Resource Management System utilized by the Federal Bureau of Land Management (BLM) and the Visual Management System utilized by the U. S. Forest Service (FS).

The California Coastal Commission (CCC) regulates development projects within the coastal zone for jurisdictions that do not have a local coastal program (LCP) or land use plan (LUP). California's Scenic Highway Program helps to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of land adjacent to those highways. The nearest officially designated Scenic Highway to either the Ports and downtown Los Angeles would be Route 2 (Angeles Crest Scenic Byway) near La Canada/Flintridge, in the northeastern portion of Los Angeles County.

General plans, the primary document that establishes local land use policies and goals, are prepared by the counties and incorporated cities within the Basin. These general plans establish local policies related to aesthetics and the preservation of scenic resources within their communities or subplanning areas, and may include local scenic highway programs.

1.5 EXECUTIVE SUMMARY: CHAPTER 4 – ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Chapter 4 provides a detailed review of the environmental topics that were identified in the NOP/IS where potentially significant adverse impacts were identified (see Appendix A). Each of the proposed control measures was evaluated to determine the environmental topics that would potentially be impacted, if the control measure or strategy was adopted. The following subsections provide a brief discussion of the potential environmental impacts and mitigation measures for each environmental category analyzed. Table 1-1 provides a summary of the impacts identified under each resource category, identifies mitigation measures that were imposed (if applicable), and identifies the remaining impacts following mitigation.

1.5.1 AIR QUALITY AND GREENHOUSE GASES

Subchapter 4.1 identifies and quantifies direct air quality effects, that is, emission reductions anticipated to occur as a result of implementing the various control measures. This subchapter also examines indirect air quality impacts, that is, potential air pollutant emission increases that could occur as a consequence of efforts to improve air quality (e.g., emissions from control equipment such as afterburners). The NOP/IS (Appendix A) determined the air quality impacts of the proposed project are potentially significant. In particular some of the control measures could: 1) generate emissions during the construction phases needed to implement the proposed control measures; 2) generate additional emissions from power plants that would need to expand to produce additional electricity to operate zero and near-zero technologies; 3) generate additional toxic air contaminants (e.g., increased ammonia use and additional TACs associated with reformulated products); 4) generate additional emissions from refineries to produce reformulated or alternative fuels; and 5) generate additional trips to transport materials.

It is expected that many 2016 AQMP control measures will be promulgated as rules, laws, or ordnances by state (California), regional (SCAQMD, special districts, and counties), and local (cities) agencies. Because requirements of rules, laws, and ordinances can be enforced by the adopting agency, a conservative approach maximizing potential air quality and GHG impacts is the appropriate approach to analyzing potential secondary air quality impacts in this Program EIR. A number of control measures, however, involve incentives or voluntary compliance to achieve emission reductions. Since these types of control measures are not enforceable as they do not involve adoption by applicable agencies, the magnitude of impacts is uncertain. To further provide a conservative analysis of potential air quality and GHG impacts from adopting and implementing the 2016 AQMP, incentive or voluntary control measures will be treated like control measures that are expected to be adopted by applicable agencies, thus, maximizing potential impacts from these control measures.

The 2016 AQMP would result in a reduction of criteria pollutants in the Basin, thereby attaining the air quality standards. Additionally, during operation, less than significant air quality and GHG impacts are anticipated. However, significant adverse construction air quality and GHG impacts could be caused by the proposed project. As improved emission reduction technologies become available and as specific control measures are developed and projects proposed, construction mitigation measures will be updated and implemented. Further, future projects that implement

2016 AQMP control measures, including promulgating control measures such as SCAQMD rules or regulations or individual projects that implement the requirements of such promulgated rules where subsequent CEQA construction analyses have been performed, shall rely upon the results of these subsequent CEQA analyses, including whether or not mitigation measures will continue to be required. Implementation of mitigation measures AQ-1 to AQ-23 would reduce construction emissions but the overall construction air quality and GHG impacts after mitigation would likely remain significant.

1.5.2 ENERGY

Subchapter 4.2 examines impacts on the supply and demand of energy sources from implementing the proposed control measures in the 2016 AQMP. The NOP/IS for the 2016 AQMP (Appendix A) identified the following activities associated with implementing the proposed control measures as having potentially significant energy impacts: 1) potential increase in electricity demand due to increase penetration of near-zero and zero emission technologies; 2) potential increase in natural gas demand; 3) potential increase in electricity demand associated with operating new control equipment; and 4) potential increase in the use of alternative fuels.

All control measures in the 2016 AQMP were evaluated to determine whether or not they could generate direct or indirect energy impacts based on the anticipated methods of control. Some of the control measures would require increased energy use, for example through the increased penetration of zero emission mobile sources. Other measures would alter the form of energy used, for example switching from gasoline or diesel power to alternative fuels. Evaluation of control measures was based on examination of the impact of the control measures and technologies in light of current energy trends. All control measures were analyzed to identify both beneficial effects (energy conserving) and adverse impacts (energy consuming).

The 2016 AQMP will result in less than significant impacts to the increased demand of alternative fuels, alternative energy, renewable energy, petroleum fuels, and natural gas. However, the electricity consumption impacts are significant because the potential 2024 electricity usage increase would exceed baseline electricity consumption by 7.8 to 12.7 percent. Even with implementation of mitigation measures E-1 to E-7, electricity consumption impacts would remain significant.

1.5.3 HAZARDS AND HAZARDOUS MATERIALS

Subchapter 4.3 identifies the potential hazard impacts as a result of implementing the control measures in the 2016 AQMP. The NOP/IS (Appendix A) for the 2016 AQMP identified the following types of control measures as having potentially significant hazards and hazardous materials impacts: 1) use of reformulated coatings, solvents, and consumer products; 2) increase in the transportation and disposal of reformulated products; 3) the use of ammonia in selective catalytic reduction (SCR) or selective non-catalytic reduction (SNCR) air pollution control technology; 4) use of alternative fuels; and, 5) use of catalysts. Although the NOP/IS concluded that there were no impacts from sites included on a list of hazardous materials sites that would create a hazard to the public and the environment, comments were received on the NOP/IS on this topic area. Therefore, an analysis of this topic area has also been included in this subchapter.

The fire hazard impacts associated with reformulated coatings, solvents, and consumer products in the 2016 AQMP are expected to be significant, as more flammable materials may be used. The SCAQMD cannot predict which coatings, solvents, adhesives, and sealants each affected facility might choose to use in the future as reformulated products become available or estimate the amount of coatings to be used. Mitigation measures were crafted to inform consumers about any potential fire hazards that may be associated with those reformulated products that may have increased flammability. While the promotion of consumer awareness may be helpful for safety reasons, these mitigation measures do not physically reduce any fire hazards in the reformulated products themselves. Thus, after implementation of mitigation measures HZ-1 and HZ-2, the fire hazards impacts are expected to remain significant.

The impacts from tank rupture of LNG and ammonia (in the non-refinery sector), and transport of LNG and ammonia are expected to remain significant even after implementation of mitigation measures HZ-3 to HZ-6.

In addition to the federal, state, and local regulations that facilities and sites listed on lists pursuant to Government Code §65962.5 must comply with, implementation of mitigation measures HZ-7 to HZ-15 will reduce the impacts to less than significant.

Implementation of the 2016 AQMP is expected to result in an overall reduction in toxic emissions due to the toxic control measures. Nevertheless, hazard impact associated with implementation of the 2016 AQMP control measures could result in potentially significant hazard impacts at sensitive receptors, including existing and proposed school sites. The location of the facilities that may use hazardous materials as a result of the 2016 AQMP control measures is currently unknown. While mitigation measures HZ-16 through HZ-18 would reduce the potentially significant hazard impacts and additional mitigation measures may be available on a site-specific basis (e.g., containment facilities, appropriate placement of tanks, etc.), the potential hazard impacts associated with the handling of hazardous or acutely hazardous materials within one-quarter mile of an existing or proposed school site remain significant.

1.5.4 HYDROLOGY AND WATER QUALITY

Subchapter 4.4 identifies the potential hydrology and water quality impacts as a result of implementing the control measures in the 2016 AQMP. The NOP/IS for the 2016 AQMP identified the following potentially significant hydrology and water quality impacts that may occur: 1) potential increase in water demand; 2) potential increase in wastewater discharge and related water quality impacts; 3) water quality impacts associated with increased use of alternative fuels; 4) water quality impacts associated with the accidental release of ammonia from operation of selective catalytic reduction (SCR) or selective non-catalytic reduction (SNCR) air pollution control technology; 5) water quality impacts associated with accidental releases from battery disposal and processing including acid spills; and, 6) wastewater discharge from the use of reformulated products.

Wastewater treatment facilities are expected to have sufficient capacity to handle the estimated increase in wastewater that could be generated by the 2016 AQMP. Any accidental spills and wastewater discharged due to the 2016 AQMP would not be expected to violate water quality standards and thus, these impacts would be less than significant. Furthermore, the increased use of alternative fuels, electric cars, ammonia, and SBS were also concluded to have less than significant hydrology and water quality impacts.

The water demand associated with certain air pollution control technologies the use of waterborne coatings could exceed the significance threshold of 262,820 gallons per day for potable water demand and five million gallons per day of total water demand. Thus, the overall water demand from implementing the 2016 AQMP is concluded to have significant hydrology (water demand) impacts. The source of water to meet the projected demand will vary from jurisdiction to jurisdiction but can include additional use of ground water and recycled water resources. Most of the ground water basins used for water supply are managed to minimize and prevent overdraft conditions.

The increased water demand is expected to be associated with existing sources within the Basin which already have water conveyance infrastructure. Therefore, the construction of new water conveyance infrastructure is not expected to be required.

While mitigation measures WQ-1 through WQ-4 could help minimize some of the water demand on an individual facility-basis, the availability of water supplies varies throughout the region; thus, not all mitigation measures will be applied in all situations. For this reason, the mitigation measures are not expected to fully eliminate the significant water demand impacts. Therefore, water demand and groundwater depletion impacts generated by the 2016 AQMP are expected to remain significant.

1.5.5 NOISE

Subchapter 4.5 identifies the potential noise impacts as a result of implementing the control measures in the 2016 AQMP. The NOP/IS (Appendix A) for the 2016 AQMP identified the following types of control measures as having potentially significant noise impacts: 1) potential temporary changes in noise volume due to construction activities needed for installation of equipment and potential new roadway infrastructure; and 2) increased street sweeping activities.

Installing air pollution control equipment on stationary sources could generate noise and vibration impacts, but virtually all of the control equipment would be installed within industrial and commercial facilities. Further, noise requirements and noise ordinances would continue to apply to stationary sources, so that noise impacts on sensitive receptors are expected to be less than significant.

Control measures are not expected to require street sweeping in areas where there is no current street sweeping. Rather it may increase the number of times that roads in certain areas are swept. The roads that are most likely to require additional sweeping are those in industrial and commercial areas where sensitive receptors are not located. Therefore, because additional street sweeping is not expected to be required in residential or other noise-sensitive areas, additional street sweeping activities that may be required are not expected to result in significant noise impacts.

Construction activities are often limited to daytime hours to prevent noise impacts during the more sensitive nighttime hours. However, transportation-related construction activities often occur during the evening/nighttime hours to minimize traffic impacts during the more heavy traffic periods. For example, construction activities related to catenary overhead lines may occur during the evening/nighttime hours to minimize traffic conflicts, as construction would be expected along existing roads and transportation corridors. While mitigation measures NS-1 to NS-17 would minimize some of the noise and vibration impacts from construction, the SCAQMD cannot predict how a lead agency or responsible agency might choose to mitigate a significant construction noise and vibration impacts for a future project. Therefore, noise and vibration impacts from construction of implementing the 2016 AQMP are expected to remain significant.

1.5.6 SOLID/HAZARDOUS WASTE

Subchapter 4.6 identifies the potential solid and hazardous waste impacts as a result of implementing the control measures in the 2016 AQMP. The NOP/IS (Appendix A) for the 2016 AQMP identified the following types of control measures as having potentially significant solid and hazardous waste impacts due to potential increases in waste from: 1) construction; 2) the disposal of old equipment; 3) spent catalysts; 4) street sweeping activities; 5) spent filters and baghouses; 6) limitations on waste burning; and, 7) vehicle/equipment scrapping and car battery disposal.

Due to the recycling value of the materials involved, the increased use of electric or hybrid vehicles and subsequent generation of batteries and other types of waste from air pollution control technology and devices were found to result in less than significant impacts to solid and hazardous waste.

For equipment that may be retired before the end of its useful life, that equipment may be reused in areas outside the Basin (with the exception of vehicles). Equipment with no remaining useful life is expected to be recycled for metal content. However, the high volume of vehicle and equipment to retire in a short timeframe and uncertainty of their outcome would result in potential significant solid and hazardous waste impacts due to implementation of the 2016 AQMP. Furthermore, the extent and timing of construction needed to implement the 2016 AQMP is not known at this time, but the potential to exceed landfill capacities in the short term was found to be significant. No mitigation measures were identified and the impacts remain significant.

1.5.7 TRANSPORTATION AND TRAFFIC

Subchapter 4.7 identifies the potential transportation and traffic impacts as a result of implementing the control measures in the 2016 AQMP. The NOP/IS (Appendix A)for the 2016 AQMP identified the following types of control measures as having potentially significant transportation and traffic impacts: 1) changes in traffic volumes and patterns due to construction activities; 2) operational traffic increases due to increased transportation of catalyst, alternative fuels, or other chemicals such as ammonia, waste disposal, and agricultural materials (from chipping, grinding, or composting facilities); 3) increases in congestion due to increased street sweeping; and 4) operation of new transportation infrastructure.

Construction activities necessary to modify existing rail and truck routes/corridors would vary depending on the location and the specific traffic impacts are unknown. Project specific impacts would require a separate CEQA evaluation. However, all traffic impacts, although temporary in nature, could be significant and result in a reduction of LOS at local intersections, result in partial or temporary road or lane closures, result in additional traffic congestion, and potentially impact roadways within the County's congestion management plan.

Additional traffic will be generated by the 2016 AQMP due to the need to transport increased waste for disposal (e.g., construction debris, waste from scrapping of old equipment/vehicles, and waste from air pollution control equipment, such as filters), increased waste material for recycling (e.g., catalysts), increased use of products (e.g., ammonia), and increased transportation or agricultural material for chipping, grinding or composting facilities. Transportation infrastructure improvements pertaining to overhead catenary electrical lines could require the dedication of an existing lane exclusive to vehicles using the overhead catenary electrical lines or fixed guideway systems. The dedication of an existing lane would mean that other vehicles would have reduced access to available driving lanes. Thus, a reduction in the number of available lanes on a roadway to accommodate vehicles using the overhead catenary electrical lines may occur which could adversely affect traffic and congestion for all other vehicles on the road. Furthermore, if the barge-based bonnet technology is used to reduce emissions from ocean going vessels, the increase in barges at the harbors could create a significant congestion and traffic hazard impact.

While mitigation measure TR-1 could help minimize some of the significant construction impacts, the SCAQMD cannot predict how a future lead agency might choose to mitigate a particular significant traffic and transportation impact. Thus, the future traffic and transportation impacts are considered to be significant due to implementation of the 2016 AQMP control measures.

1.5.8 AESTHETICS

Subchapter 4.8 identifies the potential aesthetics impacts as a result of implementing the control measures in the 2016 AQMP. The NOP/IS for the 2016 AQMP did not identify any control measures as having potentially significant aesthetic impacts. However, comments were received on the NOP/IS relative to aesthetics impacts. After consideration of these comments and further review of the control measures, implementation of some 2016 AQMP control measures could change the existing visual character or quality of any site on which certain types of technologies may be installed and its surroundings and result in glare. Therefore, analysis of these potentially significant impacts have been included.

During construction, the equipment staging and laydown areas would be in close proximity to the each affected site and could create a temporary, but potentially significant aesthetic impact due to the degradation of the existing visual character of the each affected sites.

Implementation of the 2016 AQMP may substantially degrade the existing visual character or quality of a site and its surroundings from the installation of catenary lines and use of bonnet technology on vessels at the Ports. Furthermore, the installation of solar panels and cool roof technology would significantly increase the amount of glare generated. While mitigation measures

AE-1 through AE-5 could minimize some of the aesthetics impacts, the SCAQMD cannot predict how a lead agency might choose to mitigate a particular significant aesthetics impact for future project(s) located in areas with project-specific features and issues. Thus, the potential exists for impacts for future projects to be significant even after feasible mitigation measures are identified and imposed. Therefore, aesthetics impacts that may occur as a result of implementing the 2016 AQMP are expected to remain significant after mitigation.

1.6 EXECUTIVE SUMMARY: CHAPTER 5 – CUMULATIVE IMPACTS

CEQA Guidelines §15130 (a) requires an EIR to discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable, as defined in §15065 (a)(3). The 2016 AQMP is a regional plan that includes broad policy criteria and as such, the 2016 AQMP Program EIR evaluates the environmental impacts associated with implementing the 2016 AQMP stationary and mobile source control measures to determine whether or not the impacts of the project are cumulatively considerable when combined with potential impacts associated with other similar regional projects involving regulatory activities or other projects with similar impacts.

The 2016 AQMP control measures consist of three components: 1) the SCAQMD's Stationary and Mobile Source Control Measures; 2) State and Federal Mobile Source Control Measures; and 3) Regional Transportation Strategy and Control Measures provided by SCAG. The cumulative impacts analysis for the 2016 AQMP Program EIR includes the project-specific analyses of the SCAQMD's stationary and mobile source control measures and CARB's mobile source control measures, as well as the transportation control measures (TCMs) that were developed and adopted by SCAG as part of the 2016 RTP/SCS and the 2015 Federal Transportation Improvement Program (FTIP) (SCAG 2016) (2016 AQMP, Appendix IV-C). The TCMs are appropriately part of the cumulative impact analysis because they include regulatory activities associated with measures that could also generate related environmental impacts within the Basin.

The following sections summarize the project-specific and cumulative impacts analyses from the Final Program EIR for the 2016 RTP/SCS. The discussions also summarize project-specific impacts from the 2016 AQMP, which includes both SCAQMD control measures as well as control measures included in CARB's State SIP Strategy. The discussions also include an evaluation regarding whether or not impacts from the 2016 AQMP contribute to cumulative impacts from the 2016 RTP/SCS, which have already been evaluated in a Program EIR certified by SCAG.

1.6.1 AESTHETICS

Aesthetic impacts from zero or near-zero emission equipment are primarily associated with the installation of catenary poles and overhead wires, use of bonnet technology to reduce emissions from ocean going vessels at the ports, and increased glare from solar panels and use of cool roof technology. During construction, the equipment staging and laydown areas would be in close proximity to the each affected site and could create a temporary, but potentially significant aesthetic impact due to the degradation of the existing visual character of the each affected sites. The areas where these facilities may be located are not expected to be near an officially designated Scenic Highway or a roadway eligible for State Scenic Highway Designation. The overhead power lines and catenary system would not be visible from this distance to an officially designated Scenic

Highway or to a roadway eligible for designation as a Scenic Highway. However, the catenary poles and overhead electric wires could degrade the existing visual character or quality of the surrounding area and are considered to be potentially significant.

According to the 2016 RTP/SCS Program EIR, implementation of the 2016 RTP/SCS would adversely affect aesthetics and views. Expected significant impacts would include the obstruction of scenic views and vista points due to the construction of highways, connectors, interchanges, goods movement roadway facilities, high speed rail, and sound walls for anticipated RTP/SCS transportation projects, which would potentially block or impede views of mountains, oceans, or rivers. Development in floodplains, wetlands, wooded areas, coastal bluffs, lagoons, reservoirs, regional parks, recreational areas, agricultural lands, or in areas that include steep slopes or scenic vistas has the potential to adversely impact visual resources.

The 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulative considerable impacts to aesthetic resources identified in the 2016 RTP/SCS because potential aesthetic resources impacts identified in the 2016 RTP/SCS Program EIR are different than the potential aesthetic impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect aesthetic resources impacted by the 2016 RTP/SCS.

Impacts from implementation of the 2016 AQMP to aesthetic resources were determined to generate significant adverse aesthetic impacts. Therefore, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to aesthetic resources identified in the 2016 RTP/SCS.

1.6.2 AGRICULTURAL RESOURCES

For the 2016 AQMP, impacts to agriculture and forestry resources were determined to be below the level of significance in the NOP/IS. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulatively considerable impacts to agricultural resources identified in the 2016 RTP/SCS because potential agriculture and forestry resource impacts identified in the 2016 RTP/SCS Program EIR are different than the potential agricultural impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect agricultural resources impacted by the 2016 RTP/SCS.

1.6.3 AIR QUALITY AND GREENHOUSE GASES

Construction Impacts: Construction activities associated with the 2016 AQMP would result in significant impacts to the air quality resource and any concurrent emissions-generating activities from reasonably foreseeable construction activities would add an additional air emission burden to these significant levels. Therefore, construction air quality impacts from the 2016 AQMP are considered to be cumulatively considerable and would contribute to significant adverse cumulative impacts from the 2016 RTP/SCS.

Operational Impacts – Criteria Pollutants: The 2016 AQMP is expected to result in an emissions reduction in NOx, VOC, SOx, and PM emissions, providing an air quality benefit. The federal annual PM2.5 standards are predicted to be achieved in 2023 with implementation of the proposed ozone strategy and the California annual PM2.5 standard will be achieved in 2025. The 2016 AQMP is also expected to achieve the ozone 8-hour standard by 2023. Preliminary analysis suggests additional emission reductions beyond the level required in 2031 are needed to meet the 70 ppb ozone standard.

Although existing and future air quality rules and regulations are expected to minimize emissions associated with increased generation of electricity, the 2016 AQMP will result in a substantial increase in electricity generation. The electricity providers have committed to meeting the increased energy demand and the emissions from the generation of this increase demand has been included in the emission inventory of the 2016 AQMP. No significant air quality impacts from control of stationary sources were identified associated with implementation of the 2016 AQMP. Control measures in the 2016 AQMP would also reduce emissions from mobile sources and VOC emissions from reformulation of coatings.

Under the 2016 RTP/SCS, mobile source criteria pollutants are expected to have a short term increase during construction activities, but long term air quality impacts are expected to remain the same or decrease compared to baseline (2012) levels.

Implementation of the 2016 AQMP would not in itself result in significant adverse operational air quality impacts associated with operational activities. For this reason, the 2016 AQMP would not be expected to contribute to significant adverse cumulative impacts from transportation projects projected in the 2016 RTP/SCS.

Operational Impacts – TACs: Control measure CMB-05 may result in the use of ammonia in SCRs and SNCRs. BACT (i.e. catalyst) for ammonia slip from SCR units is restricted to five ppm or less, which has been shown through source-specific permit modeling to have no significant impact on surrounding communities. The 2016 AQMP is expected result in an overall reduction in TAC emissions as it includes a number of measures to reduce TAC emissions. The 2016 AQMP would also accelerate the penetration of partial-zero and zero emission vehicles and other mobile sources, reducing the use of conventional fuels and the related air emissions, which include TACs (such as DPM). Therefore, implementing 2016 AQMP control measures is not expected to generate significant adverse air quality impacts from increased exposure to TAC emissions.

Under the 2016 RTP/SCS, the maximum cancer potential is less than existing conditions even though vehicle miles traveled (VMT) is expected to increase. However, despite an overall cancer risk reduction, minor exposure of sensitive receptors to pollutants exceeds the cancer risk threshold, mainly around areas of high traffic volume areas such as freeways, which was deemed to be significant. A focus on creating more high quality transit areas (HQTAs) is expected to further reduce public health risks by promoting an increase in active transportation (e.g. biking and walking) which in turn contributes to pollutant level reductions.

Implementation of the 2016 AQMP would not in itself result in significant air quality impacts associated with non-criteria pollutants. Moreover, the 2016 AQMP would not contribute to impacts associated with transportation projects projected in the 2016 RTP/SCS and, therefore, would not be expected to contribute to a cumulatively considerable impact.

Greenhouse Gas Emissions: Electricity is expected to be the predominant alternative fuel because it is more available, affordable, and can be used to power zero emission vehicles. Existing power generating facilities are subject to AB32 and will be required to reduce GHG emissions by 2020 and any future power generating stations would be subject to stringent emission control requirements, including GHG emissions. As a result, GHG emissions associated with the use of alternative fuels are expected to be less than GHG emissions associated with the use of petroleum-based fuels. Therefore, no increase in GHG emissions is expected from the increased production and use of alternative fuels and GHG emission impacts are expected to be less than significant.

According to the 2016 RTP/SCS Program EIR, implementation of the 2016 RTP/SCS projects would result in a 24 percent decrease in GHG emissions by 2040 for both mobile source and residential/commercial buildings. The 2016 RTP/SCS meets or exceeds emission reduction targets for cars and light duty trucks set forth by SB375, and as such would result in a less than significant impact related to per capita emissions and SB375. Additionally, the 2016 RTP/SCS is expected to comply with reduction targets outlined in AB32 as the 2016 RTP/SCS contributes its reductions share for responsible sectors. However, there are potential significant GHG impacts if other responsible agency implementation activities do not achieve their respective GHG emission reduction goals to the appropriate level.

Implementation of the 2016 AQMP would not result in significant GHG impacts. Moreover, the 2016 AQMP would not contribute to impacts associated with transportation projects projected in the 2016 RTP/SCS and, therefore, would not be expected to contribute to a cumulatively considerable impact requiring mitigation.

1.6.4 BIOLOGICAL RESOURCES

Impacts to biological resources were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse biological impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulative considerable impacts to biological resources identified in the 2016 RTP/SCS because potential biological resources impacts identified in the 2016 RTP/SCS Program EIR are different than the potential biological impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect biological resources impacted by the 2016 RTP/SCS.

1.6.5 CULTURAL RESOURCES

Impacts to cultural resources were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse cultural impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulative considerable impacts to cultural resources identified in the 2016 RTP/SCS because potential cultural resources impacts identified in the 2016 RTP/SCS Program EIR are different than the potential cultural impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect cultural resources impacted by the 2016 RTP/SCS.

1.6.6 ENERGY

The 2016 AQMP could result in significant adverse electricity consumption impacts because the potential electricity usage increase would exceed baseline electricity consumption by 7.8 to 12.7 percent. No significant impacts on natural gas supplies and petroleum fuels associated with the 2016 AQMP were identified because of the anticipated reduction in future demand and wide availability of natural gas. Additionally, potential alternative energy demand impacts are expected to be less than significant as adequate supplies are available.

The 2016 RTP/SCS Program EIR concluded that overall energy demand would increase as a result of implementation of the 2016 RTP/SCS. Under the 2016 RTP/SCS, the regional transportation system has the potential to increase petroleum and non-renewable fuel consumption but the increase in active transportation, the encouragement of carpooling and transit use, and better fuel economy would result in less transportation related fuel consumption. Despite an expected per capita decrease in energy consumption, overall residential and commercial building energy consumption would increase due to a growth in the population and an increased number of households and is expected to be significant.

The 2016 AQMP control measures would result in significant adverse energy demand impacts and when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to energy identified in the 2016 RTP/SCS, therefore resulting in a significant cumulative impact.

1.6.7 GEOLOGY AND SOILS

Impacts to geology and soils were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse geology and soil impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulative considerable impacts to geology and soil resources identified in the 2016 RTP/SCS because potential geology and soil impacts identified in the 2016 RTP/SCS Program EIR are different than the potential geology and soil impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect geology and soils impacted by the 2016 RTP/SCS.

1.6.8 HAZARDS AND HAZARDOUS MATERIALS

The fire hazard impacts associated with reformulated coatings, solvents, and consumer products in the 2016 AQMP are expected to be significant, as more flammable materials may be used. The impacts from tank rupture of LNG and ammonia (in the non-refinery sector), and transport of LNG and ammonia are expected to remain significant even after implementation of mitigation. In addition to the federal, state, and local regulations that facilities and sites listed on lists pursuant to Government Code §65962.5 must comply with, implementation of mitigation measures will reduce the impacts to less than significant.

Implementation of the 2016 AQMP is expected to result in an overall reduction in toxic emissions due to the toxic control measures. Nevertheless, hazard impact associated with implementation of the 2016 AQMP control measures could result in potentially significant hazard impacts at sensitive receptors, including existing and proposed school sites. The location of the facilities that may use hazardous materials as a result of the 2016 AQMP control measures is currently unknown. While mitigation measures would reduce the potentially significant hazard impacts and additional mitigation measures may be available on a site-specific basis (e.g., containment facilities, appropriate placement of tanks, etc.), the potential hazard impacts associated with the handling of hazardous or acutely hazardous materials within one-quarter mile of an existing or proposed school site remain significant.

Furthermore, implementation of the 2016 RTP/SCS could potentially take place on sites which are included on a list of hazardous material sites and as such potentially disturb contaminated property during construction activities. The 2016 RTP/SCS also has the potential to impair or interfere with emergency response procedures and emergency evacuation plans due to roadway closures and congestion as a result of construction. There is the potential for the 2016 RTP/SCS to expose people to significant impacts from wildland fires due to possible development in areas with a high fire hazard risk. Finally, the 2016 RTP/SCS Program EIR concluded that the forecasted urban development and growth that would occur under the 2016 RTP/SCS and the increased mobility provided by the 2016 RTP/SCS would result in increased hazardous materials transport outside of the SCAG region and as such would contribute to cumulatively considerable hazard impacts.

The 2016 AQMP control measures would result in significant adverse hazards and hazardous waste impacts and when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to hazards and hazardous waste identified in the 2016 RTP/SCS, therefore resulting in a significant cumulative impact.

1.6.9 HYDROLOGY AND WATER QUALITY

Water demand associated with the manufacture and use of waterborne coatings, solvents, and other consumer products, and add-on air pollution control technologies that may be required to comply with the 2016 AQMP control measures, such as wet ESPs and WGSs, are potentially significant as they would exceed SCAQMD water demand significance thresholds.

The impacts of the 2016 AQMP on water demand are expected to be significant prior to mitigation. While generally the mitigation measures could help minimize some of the water demand, on an individual facility-basis, the availability of water supplies varies throughout the region, thus, not all mitigation measures will be applied in all situations. For this reason, the mitigation measures are not expected to fully eliminate the potential water demand impacts and water demand impacts remain significant. The hydrology and water quality impacts associated with wastewater generation, use of alternative fuels, increased use of electric vehicles, use of SBS, and ammonia are expected to be less than significant.

The 2016 RTP/SCS impacts associated with hydrology and water quality would be reduced following the implementation of the 2016 RTP/SCS Program EIR mitigation measures. However, 2016 RTP/SCS impacts would remain significant following mitigation for ground water resources (water demand), alteration of existing drainage patterns that could result in flooding, increased water runoff, and potential for inundation by seiche, tsunami or mudflow.
The 2016 AQMP control measures would result in significant adverse water demand impacts and when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to hydrology and water quality identified in the 2016 RTP/SCS. Therefore, resulting in a significant cumulative impact.

1.6.10 LAND USE AND PLANNING

Impacts to land use and planning were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse land use and planning impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulative considerable impacts to land use and planning identified in the 2016 RTP/SCS because potential land use and planning impacts identified in the 2016 RTP/SCS Program EIR are different than the potential land use and planning impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect land use and planning impacted by the 2016 RTP/SCS.

1.6.11 MINERAL RESOURCES

Impacts to mineral resources were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse mineral impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulative considerable impacts to mineral resources identified in the 2016 RTP/SCS because potential mineral resources impacts identified in the 2016 RTP/SCS Program EIR are different than the potential mineral impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect mineral resources impacted by the 2016 RTP/SCS.

Potential mineral resource impacts from the 2016 RTP/SCS would be reduced following the implementation of 2016 RTP/SCS Program EIR mitigation measures. However, 2016 RTP/SCS impacts would remain significant following mitigation as the population growth projected by 2040 in combination with projects identified in the 2016 RTP/SCS would still impact mineral resources. Moreover, the 2016 AQMP would not contribute to that impact, so adverse cumulative mineral resource impacts are concluded to be less than significant.

1.6.12 NOISE

Construction Impacts: Implementation of the 2016 AQMP control measures associated with air pollution control technologies and exhaust standards would not result in noise and vibration impacts because construction activities would occur within appropriately zoned industrial and commercial areas, impacts would be temporary and limited to construction activities, and construction noise/vibration impacts to sensitive receptors would not be expected. However, implementation of the 2016 AQMP control measures associated with construction of overhead catenary lines could result in significant noise and vibration impacts due to the geographic proximity of sensitive receptors.

According to the 2016 RTP/SCS Program EIR, grading and construction activities associated with the proposed transportation projects, as well as anticipated development, would intermittently and temporarily generate noise and vibration levels above ambient background levels in such a way that would not have occurred without the project. Noise and vibration levels in the immediate vicinity of the construction sites would increase substantially at times for an extended duration, resulting in temporary noise increases at nearby sensitive receptors, creating significant adverse noise impacts.

Although impacts would be reduced following implementation of noise mitigation measures, noise and vibration impacts associated with the construction of catenary lines would remain significant in areas where sensitive receptors are located near transportation corridors. The 2016 RTP/SCS impacts associated with noise would be reduced following the implementation of 2016 RTP/SCS Program EIR mitigation measures. However, 2016 RTP/SCS impacts would remain significant following mitigation for noise and vibration during construction activities and operational activities. Therefore, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with the 2016 RTP/SCS transportation projects, would contribute to cumulatively considerable noise and vibration impacts during construction.

Operational Impacts: Implementation of the 2016 AQMP control measures is not expected to result in significant adverse operational noise impacts because the 2016 AQMP control measures affect existing commercial or industrial facilities typically located in appropriately zoned industrial or commercial areas. It is not expected that modifications to install air pollution control equipment would substantially increase ambient noise levels in the area, either permanently or intermittently, or expose people to excessive noise levels that would be noticeable above and beyond existing ambient levels. Although overhead catenary lines could be installed to comply with certain control measures, these lines would be installed along existing roadways and transportation corridors and as such would not result in the construction of new roadways or corridors.

According to the 2016 RTP/SCS Program EIR, noise sensitive land uses could be exposed to operational noise in excess of normally acceptable noise levels. These areas could experience substantial increases in noise as a result of the following: operation of expanded or new transportation facilities (i.e., increased traffic resulting from new or expanded highways, the use of new transit corridors or increased use of existing corridors, and a capacity increase in freight and passenger rail), and increased vehicle activity (autos, trucks, buses, trains etc.) associated with development and resulting in increased ambient noise next to transportation facilities.
The 2016 AQMP control measures would result in significant adverse noise impacts and when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to noise identified in the 2016 RTP/SCS, therefore resulting in a significant cumulative impact.

1.6.13 POPULATION AND HOUSING

Impacts to population and housing were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse population and housing impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulative considerable impacts to population and housing identified in the 2016 RTP/SCS because potential population and housing impacts identified in the 2016 RTP/SCS Program EIR are different than the potential population and housing impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect population and housing impacted by the 2016 RTP/SCS.

1.6.14 PUBLIC SERVICES

Impacts to public services were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse public service impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulative considerable impacts to public services identified in the 2016 RTP/SCS because potential public service impacts identified in the 2016 RTP/SCS Program EIR are different than the potential public service impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect public services impacted by the 2016 RTP/SCS.

1.6.15 RECREATION

Impacts to recreation were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse recreation impacts. Further, the 2016

AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulative considerable impacts to recreation identified in the 2016 RTP/SCS because potential recreation impacts identified in the 2016 RTP/SCS Program EIR are different than the potential recreation impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect recreation impacted by the 2016 RTP/SCS.

1.6.16 SOLID AND HAZARDOUS WASTE

Implementation 2016 AQMP control measures would not significantly increase disposal of spent batteries, activated carbon, filters, and catalysts, and the early retirement of older equipment/vehicles and replacement with newer and lower emission technology equipment, would not generate significant additional waste. Since spent batteries are required to be and are largely recycled, the increased use of EVs and hybrid vehicles would not result in a significant increase in the illegal disposal of batteries. In addition, solid waste impacts due to 2016 AQMP air pollution control technologies would not be significant because spent carbon and catalysts are usually recycled and reused rather than disposed in landfills and filter waste would be small because the amount of material collected is small. Control measures that would require new equipment can require that retirement occurs as the life of the old equipment is exhausted and new equipment is put into service. For equipment that may be retired before the end of its useful life, that equipment may be reused in areas outside the District (except for vehicles). Equipment with no remaining useful life is expected to be recycled for metal content. However, the impacts from waste generated from construction of 2016 AQMP control measures and from vehicle scrapping programs could result in significant impacts.

Impacts from solid waste were discussed under the combined category of Utilities and Service Systems in the 2016 RTP/SCS Program EIR, whereas impacts from hazardous waste were considered under the Hazardous Materials Section of the 2016 RTP/SCS Program EIR. Implementing the 2016 RTP/SCS would result in significant amounts of solid waste associated with construction activities of transportation projects and urban development. Construction debris would be used as fill, recycled or transported to the nearest landfill and disposed of appropriately. The 2016 RTP/SCS also has the potential to result in significant impacts when the landfill designated for the project area is insufficient in capacity to accommodate solid waste disposal needs. All projects in 2016 RTP/SCS must comply with federal, state, and local statues and regulations related to solid waste.

The 2016 AQMP control measures would result in significant adverse solid and hazardous waste impacts and when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to solid and hazardous waste identified in the 2016 RTP/SCS, therefore resulting in a significant cumulative impact.

1.6.17 TRANSPORTATION AND TRAFFIC

Some 2016 AQMP control measures could necessitate the construction of overhead catenary lines, within or adjacent to existing roadways, streets, freeways, and/or transportation corridors. Such construction activities would generate traffic associated with construction worker vehicles and trucks delivering equipment, materials and supplies to the project site during the duration of the construction activities. Construction activities, including potential lane closures, were considered to be significant.

Similarly, transportation infrastructure improvements pertaining to overhead catenary electrical lines could require the dedication of an existing lane exclusive to vehicles using the overhead catenary electrical lines or fixed guideway systems. The dedication of an existing lane would mean that other vehicles would have reduced access to available driving lanes. Thus, a reduction in the number of available lanes on a roadway to accommodate vehicles using the overhead catenary electrical lines could adversely affect traffic and congestion for all other vehicles on the road. Furthermore, if the barge-based bonnet technology is used to reduce emissions from ocean going vessels, the increase in barges at the harbors could create a significant congestion and traffic hazard impact. Significant adverse operational traffic impacts are, therefore, anticipated to be generated by the 2016 AQMP. Other than this impact, no new streets, roads, freeways, or rail lines would be required and the 2016 AQMP control measures would apply to existing transportation corridors, so no additional significant traffic impacts are expected.

The 2016 AQMP relies on transportation and related control measures developed by SCAG in the 2016 RTP/SCS. According to the Transportation, Traffic, and Safety section of the 2016 RTP/SCS Program EIR, implementation of the proposed plan has the potential to result in several significant impacts such as increased VMT, increased VHD for heavy-duty trucks, and emergency access, and less than significant impacts such as decreased VHD, lower system-wide fatality accident rate, and air traffic patterns.

The 2016 AQMP control measures would result in significant adverse transportation and traffic impacts and when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to transportation and traffic identified in the 2016 RTP/SCS. Therefore, resulting in a significant cumulative impact.

1.7 EXECUTIVE SUMMARY: CHAPTER 6 – ALTERNATIVES

1.7.1 ALTERNATIVES EVALUATED IN THE PROGRAM EIR

This Program EIR provides a discussion of alternatives to the proposed project as required by CEQA. Pursuant to the CEQA guidelines, alternatives should include realistic measures to attain the basic objectives of the proposed project but would avoid or substantially lessen any of the significant effects of the project, and provide means for evaluating the comparative merits of each alternative (CEQA, Guidelines, §15126.6(a)). In addition, though the range of alternatives must be sufficient to permit a reasoned choice, they need not include every conceivable project alternative (CEQA Guidelines §15126.6(a)). The key issue is whether the selection and discussion of alternatives fosters informed decision making and public participation. An EIR need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative (CEQA Guidelines, §15126.6(f)(3). Six alternatives were rejected as infeasible. A total of four alternatives were evaluated in the Program EIR.

Alternative 1 – No Project Alternative: CEQA requires the evaluation of the No Project Alternative, which consists of what would occur if the proposed project was not approved; in this case, not adopting the 2016 AQMP. The net effect of not adopting the 2016 AQMP would be a continuation of the 2012 AQMP and the 2007 AQMP.

Alternative 2 – Mobile Source Reduction Only: Under Alternative 2, no stationary control measures would be implemented. Only the mobile source control measures proposed by both CARB and the SCAQMD would be implemented. In order to be a viable alternative to be considered, the shortfall of NOx emission reductions needed to demonstrate attainment the ozone standards would need to be classified as CAA §182(e)(5) measures.

Alternative 3 – Regulation Only: The 2016 AQMP includes a control strategy constructed from traditional regulatory control measures, co-benefit measures and incentive-based measures that will require adopted guidelines and secured funding, along with federal enforceable commitments pursuant to U.S. EPA. Alternative 3 is designed to implement only traditional regulatory control measures and co-benefit measures. These measures are being proposed by both SCAQMD and CARB for stationary, area and mobile sources, and includes some measures regulating federal sources. By removing the emission reductions from the incentive-based measures, attainment of the standards is at risk. Therefore, by way of public comment suggestion, Alternative 3 would propose additional control measures to assist in making up the remaining emission reductions necessary to demonstration attainment of the ozone standards. If the emission reductions from the additional proposed control strategies are determined to not be enough to demonstrate attainment the ozone standards, the remaining NOx emission reductions would be classified as CAA §182(e)(5) measures.

Alternative 4 – Expanded Incentive Funding: Alternative 4 would expand the incentive funding programs to increase the penetration of cleaner vehicles and technologies, allowing for more emission reductions and possibly earlier attainment of ambient air quality standards. Depending on the method of funding, current incentive costs are in the range of 4.25 to 15.8 billion dollars. Under this alternative it would be assumed that additional incentive funding sources would be found. This alternative has the opportunity to provide for more emission reductions and ease the need for additional regulatory action. However, the attainment goals would still need to be achieved as expeditiously as practicable.

1.7.2 ALTERNATIVES ANALYSIS SUMMARY

Of the project Alternatives, Alternative 1 would generate the least severe and fewest number of environmental impacts compared to the 2016 AQMP. However, compared to the other project alternatives, Alternative 1 would achieve the fewest of the project objectives (see Chapter 2 for the comprehensive list of objectives) and would not accomplish critical objectives such as demonstrating attainment of the 2006 24-hour PM2.5 standard (35 $\mu g/m^3$) (*Objective #3*), 2012 annual PM2.5 standard (12 µg/m^3) (*Objective #4*) and the 2008 8-hour ozone standard (75 ppb) (*Objective #5*) applying the latest SCAG's 2016 RTP information and CARB's 2014 EMFAC data (*Objective #6*). Without submitting a Plan that makes these demonstrations, the region is in violation of the Clean Air Act (CAA) and at risk for sanctions and consequences. Although not required by the CAA, other objectives not fulfilled by Alternative 1 include eliminating reliance on CAA§182(e)(5) measures to the extent feasible (*Objective #12*) , taking co-benefit reductions from other planning efforts (e.g., GHG reduction targets, energy efficiency and transportation) (*Objective #13*), developing a fair share reduction strategy with federal, state and local levels (*Objective #14*), seeking funding for incentive programs (*Objective #16*), and enhancing the socioeconomic analysis (*Objective #17*).

Alternative 2 would be expected to generate equivalent impacts to the proposed project in all environmental topic areas analyzed except water demand which is primarily generated from stationary sources that are not implemented under Alternative 2. The only exception is the consumer products control measure proposed and implemented by CARB's SIP Strategy. Therefore, the potentially significant increase in water demand associated with the proposed project would be substantially less under Alternative 2 but not fully eliminated since consumer products will still be implemented. More importantly, however, is that Alternative 2 will need to rely on classifying the emission reductions not achieve from stationary sources as long-term or "black box" measure in order to demonstrate attainment of the ozone and PM2.5 standards. This would not achieve the objective to eliminate reliance on future technologies (CAA §182(e)(5)) measures to the extent feasible.

Similarly, Alternative 3 would be expected to generate overall equivalent impacts to the proposed project in all environmental topic areas analyzed except construction noise expected from the construction of the catenary line for heavy-duty truck transport on freeways. Other actions will generate construction noise under Alternative 3 but not as significant as the proposed project. Alternative 3 proposes additional control measures that will benefit air quality equal to the proposed projects with no incentive measures, but could also rely on long-term or "black box" measures for any shortfall in attainment demonstration of the ozone and PM2.5 standards. Similar to Alternative 2, if this is the case, Alternative 3 would not achieve an important objective to eliminate reliance on future technologies (CAA §182(e)(5)) measures to the extent feasible.

As discussed earlier, Alternative 4 has the potential to be the environmentally superior alternative if the additional incentive funding is secured, the programs are more effective than the proposed project and the potential secondary impacts from the additional funded projects are outweighed by the additional emission reductions achieved, thus more overall air quality benefit. Alternative 4 achieves all the project objectives as does the proposed project.

Based on the above information and discussion, the proposed project has been proven to be the most effective project that achieves the all the project objectives relative to environmental impacts generated. While adverse secondary impacts will be difficult to avoid, mitigation measures are proposed and an overall air quality benefit will result along with reductions in toxics and GHGs. The proposed project will satisfy the CAA and not put the region in legal vulnerability that could harm the environment, communities and businesses.

1.8 EXECUTIVE SUMMARY: CHAPTERS 7 AND 8

Chapter 7 provides the references and Chapter 8 provides the acronyms for the 2016 AQMP Program EIR.

TABLE 1.9-1

Summary of Environmental Impacts, Mitigation Measures and Residual Impacts

Impact	Mitigation Measures	Residual Impacts
AIR QUALITY AND GREENHOUSE GASES		
The construction phases of the proposed project will exceed the regional significance thresholds.	AQ-1 During construction, require the use of 2010 and newer diesel haul trucks (e.g., material delivery trucks and soil import/export). If the Lead Agency determines that 2010 model year or newer diesel trucks cannot be obtained, the Lead Agency shall instead requires the use of trucks that meet EPA 2007 model year NOx emissions requirements. AQ-2 Require all on-site construction equipment to meet the following: • All off road diesel-powered construction equipment greater than 50 hp shall meet the Tier 4 emission standards, where available. In addition, all construction equipment shall be outfitted with BACT devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations. • A copy of each unit's certified tier specification, BACT documentation, and CARB or SCAQMD operating permit shall be provided at the time of mobilization of each applicable unit of equipment. • Encourage construction contractors to apply for SCAQMD "SOON" funding incentives. The "SOON" program provides funds to accelerate the clean up of off-road diesel vehicles, such as heavy duty construction equipment. More information on this program can be found at the following website: http://www.aqmd.gov/tao/Implementation/SOONProgram.htm. AQ-3 Prohibit vehicles and construction equipment from idling longer than five minutes at the construction site by including these restrictions in the construction company contract(s) and by posting	Impacts remain significant and unavoidable.

	signs on-site, unless the exceptions in the CARB regulations which pertain to idling requirements are applicable. AQ-4 All on-road heavy-duty diesel trucks or equipment with a gross vehicle weight rating (GVWR) of 19,500 pounds or greater shall comply with EPA 2007 on-road emission standards for PM and NOx (0.01 gram per brake horsepower - hour (g/bhp-hr) and at least 0.2 g/bhp-hr, respectively). AQ-5 Maintain construction equipment tuned up and with two to four-degree retard diesel engine timing or tuned to manufacturer's recommended specifications that optimize emissions without nullifying engine warranties. AQ-6 The project proponent shall survey and document the proposed project's construction areas and identify all construction areas that are served by electricity. Onsite electricity, rather than temporary power generators, shall be used in all construction areas that are demonstrated to be served by electricity. AQ-7 Provide temporary traffic controls such as a flag person, during all phases of significant construction activity to maintain smooth traffic flow. AQ-8 Provide dedicated turn lanes for the movement of construction trucks and equipment on- and off-site. AQ-9 Re-route construction trucks away from congested streets or sensitive receptor areas. AQ-10 Improve traffic flow by signal synchronization. AQ-11 Reduce traffic speeds on all unpaved roads to 15 mph or less. AQ-12 Prohibit truck idling in excess of five minutes, on- and off-site. AQ-13 Schedule construction activities that affect traffic flow on the arterial system to off-peak hours to the extent practicable. AQ-14 Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 mph. AQ-15 Suspend all construction activities that generate air pollutant emissions during first stage smog alerts. AQ-16 Configure construction parking to minimize traffic interference.	

	AQ-17 Use alternative clean fueled off-road equipment or give extra points in the bidding process for contractors committing to use such equipment. AQ-18 Require covering of all trucks hauling dirt, sand, soil, or other loose materials. AQ-19 Install wheel washers where vehicles enter and exit the construction site onto paved roads or wash off trucks and any equipment leaving the site for each trip. AQ-20 Apply non-toxic soil stabilizers according to manufacturers' specifications to all inactive construction areas (previously graded areas inactive for ten days or more). AQ-21 Replace ground cover in disturbed areas as quickly as possible to minimize dust. AQ-22 Pave road and road shoulders. AQ-23 Sweep streets at the end of the day with SCAQMD Rule 1186 and 1186.1 compliant sweepers if visible soil is carried onto adjacent public paved roads (recommend water sweepers with reclaimed water).	
Operational emissions will not exceed the regional significance threshold and are less than significant.	None required.	Impacts remain less than significant.
Impacts from increased electricity demand are less than significant.	None required.	Impacts remain less than significant.
Impacts from operating air pollution control equipment would be less than significant.	None required.	Impacts remain less than significant.
Impacts from using lower VOC materials such as future coating, solvent, adhesive, and sealant rules and incentives to paint existing or new structures are expected to be less than significant.	None required.	Impacts remain less than significant.

Impacts from mobile sources are less than significant.	None required.	Impacts remain less than significant.
Impacts from miscellaneous sources are less than significant.	None required.	Impacts remain less than significant.
The 2016 AQMP will result in a reduction in TAC emissions and impacts are less than significant.	None required.	Impacts remain less than significant.
Impacts from GHG emissions for both construction and operation are less than significant.	None required.	Impacts remain less than significant.
ENERGY		
Impacts from increased electrical demand are considered significant.	E-1 Project sponsors should pursue incentives to encourage the use of energy efficient equipment and vehicles and promote energy conservation. E-2 Utilities should increase the capacity of existing transmission lines to meet forecast demand that supports sustainable growth, where feasible and appropriate, in coordination with local planning agencies. E-3 Project sponsors should submit projected electricity calculations to the local electricity provider for any project anticipated to require substantial electricity consumption. Any infrastructure improvements necessary should be completed according to the specifications of the electricity provider. E-4 Project sponsors should include energy analyses in environmental documentation (e.g., CEQA document) with the goal of conserving energy through the wise and efficient use of energy. E-5 Project sponsors should evaluate the potential for reducing peak energy demand by encouraging the charging of electrical vehicles and other mobile sources during off-peak hours. E-6 Project sponsors should evaluate the potential for reducing peak energy demand by encouraging the use of catenary or way-side electrical systems developed for transportation systems to operate during off-peak hours.	Impacts remain significant and unavoidable.

	E-7 Project sponsors should evaluate the potential for reducing peak energy demand by encouraging the use of electrified stationary sources during off-peak hours (e.g., cargo handling equipment).	
Impacts from the increased demand of alternative fuels, alternative energy, renewable energy, petroleum fuels, and natural gas are less than significant.	None required.	Impacts remain less than significant.
HAZARDS AND HAZARDOUS MATERIALS		
Impacts from the routine use of alternative fuels are less than significant.	None required.	Impacts remain less than significant.
Impacts from the routine use of caustic, catalysts, acidifiers, and sodium bisulfate are less than significant.	None required.	Impacts remain less than significant.
Impacts from spills are less than significant.	None required.	Impacts remain less than significant.
Impacts from the transportation of alternative fuels are less than significant, except for LNG.	None required.	Impacts remain less than significant.
Impacts associated with increased flammability of potential replacement solvents, reformulated coatings, adhesives, and sealants are significant.	HZ-1 Add consumer warning requirements for all reformulated products that are flammable and extremely flammable. HZ-2 Add requirements to conduct a public education and outreach program in joint cooperation with local fire departments regarding reformulated products that are flammable and extremely flammable, especially for reformulated consumer paint thinners and multi-purpose solvents.	Impacts remain significant and unavoidable.
Impacts from the storage and accidental release of ammonia in the refinery sector are less than significant.	None required.	Impacts remain less than significant.

Impacts from the storage and accidental release of ammonia in the non-refinery sector are significant.	Although there are a number of existing regulations which would reduce these impacts, mitigation measures would need to be identified on a project-by-project basis.	Impacts remain significant and unavoidable.
Impacts from the storage and transportation of LNG are significant.	HZ-3 Install secondary containment (e.g., berms). HZ-4 Install valves that fail shut. HZ-5 Install emergency release valves and barriers around LNG storage tanks to prevent the physical damage to storage tanks or limit the release of LNG from storage tanks. HZ-6 Perform integrity testing of LNG storage tanks to assist in preventing failure from structural problems. Construct a containment system to be used for deliveries during off-loading operations.	Impacts remain significant and unavoidable.
Impacts from the transportation of ammonia are significant.	No feasible mitigation measures have been identified.	Impacts remain significant and unavoidable.
Impacts from facilities and sites which might be identified on lists pursuant to Government Code §65962.5 could be significant during construction.	HZ-7 Conduct a Phase I Environmental Site Assessment prior to construction. If known contamination is discovered, a Phase II environmental Site Assessment should be conducted and provided to the Lead Agency. The recommendations in the Environmental Site Assessments should be implemented. HZ-8 Consult with the appropriate local, state, and federal environmental regulatory agencies to ensure sufficient minimization of risk to human health and environmental resources, both during and after construction, posed by soil contamination, groundwater contamination, or other surface hazards including, but not limited to, underground storage tanks, fuel distribution lines, waste pits and sumps. HZ-9 Cease work if soil, groundwater, or other environmental medium with suspected contamination is encountered unexpectedly during construction activities (e.g., identified by odor or visual staining, or if any underground storage tanks, abandoned drums, or other hazardous materials or wastes are encountered), in the vicinity of the suspect material. Secure the area as necessary and take all	Impacts are reduced to less than significant.

	appropriate measures to protect human health and the environment, including but not limited to: notification of regulatory agencies and identification of the nature and extent of contamination. Stop work in the areas affected until the measures have been implemented consistent with the guidance of the appropriate regulatory oversight authority. HZ-10 Use best management practices (BMPs) regarding potential soil and groundwater hazards. HZ-11 Soil generated by construction activities should be stockpiled on-site in a secure and safe manner. All contaminated soils determined to be hazardous or non-hazardous waste must be adequately profiled (sampled) prior to acceptable reuse or disposal at an appropriate off-site facility. Complete sampling and handling and transport procedures for reuse or disposal, in accordance with applicable local, state and federal laws and policies. HZ-12 Groundwater pumped from the subsurface should be contained on-site in a secure and safe manner, prior to treatment and disposal, to ensure environmental and health issues are resolved pursuant to applicable laws and policies. Utilize engineering controls, which include impermeable barriers to prohibit groundwater and vapor intrusion into the building. HZ-13 Prior to issuance of any demolition, grading, or building permit, submit for review and approval by the Lead Agency (or other appropriate government agency) written verification that the appropriate federal, state and/or local oversight authorities, including but not limited to the Regional Water Quality Control Board (RWQCB), have granted all required clearances and confirmed that the all applicable standards, regulations, and conditions have been met for previous contamination at the site. HZ-14 Develop, train, and implement appropriate worker awareness and protective measures to assure that worker and public exposure is minimized to an acceptable level and to prevent any further environmental contamination as a result of construction.	

	HZ-15 Where a project site is determined to contain materials classified as hazardous waste by state or federal law, submit written confirmation to appropriate local agency that all state and federal laws and regulations will be followed when profiling, handling, treating, transporting, and/or disposing of such materials.	
Impacts to schools located within a quarter mile of facilities are significant.	HZ-16 The temporary storage and handling of potentially hazardous materials/wastes should be in areas away from sensitive receptors such as schools or residential areas. These areas should be secured with chain-link fencing or similar barrier with controlled access to restrict casual contact from non-project personnel. All project personnel that may come into contact with potentially hazardous materials/wastes will have the appropriate health and safety training commensurate with the anticipated level of exposure. HZ-17 Where the construction or operation of projects involves the transport of hazardous materials, avoid transport of such materials within one-quarter mile of schools, when school is in session, wherever feasible. HZ-18 Where it is not feasible to avoid transport of hazardous materials, within one-quarter mile of schools on local streets, provide notification of the anticipated schedule of transport of such materials.	Impacts remain significant and unavoidable.
HYDROLOGY AND WATER QUALITY		
Impacts to wastewater treatment facility capacities are less than significant.	None required.	Impacts remain less than significant.
Impacts to water quality standards from accidental spills and discharge are less than significant.	None required.	Impacts remain less than significant.
Impacts from the increased use of alternative fuels, electric cars, ammonia, and sodium bisulfate are less than significant.	None required.	Impacts remain less than significant.

Impacts to water conveyance systems are less than significant.	None required.	Impacts remain less than significant.
Impacts on groundwater depletion and both potable and total water demand exceed thresholds and are significant.	WQ-1 Local water agencies should continue to evaluate future water demand and establish the necessary supply and infrastructure to meet that demand, as documented in their Urban Water Management Plans. WQ-2 Project sponsors should coordinate with the local water provider to ensure that existing or planned water supply and water conveyance facilities are capable of meeting water demand/pressure requirements. In accordance with State Law, a Water Supply Assessment should be required for projects that meet the size requirements specified in the regulations. In coordination with the local water provider, each project sponsor will identify specific on- and off-site improvements needed to ensure that impacts related to water supply and conveyance demand/pressure requirements are addressed prior to issuance of a certificate of occupancy. Water supply and conveyance demand/pressure clearance from the local water provider will be required at the time that a water connection permit application is submitted. WQ-3 Project sponsors should implement water conservation measures and prioritize the use recycled water over potable or groundwater whenever available and appropriate for end uses. WQ-4 Project sponsors should consult with the local water provider to identify feasible and reasonable measures to reduce water consumptions.	Impacts remain significant and unavoidable.
NOISE		
Impacts from increased noise and vibration during operation are less than significant.	None required.	Impacts remain less than significant.
Impacts from increased noise and vibration during construction are significant.	NS-1 Install temporary noise barriers during construction. NS-2 Use noise barriers to protect sensitive receptors from excessive noise levels during construction.	Impacts remain significant and unavoidable.

	NS-3 Schedule construction activities consistent with the allowable hours pursuant to applicable general plan noise element or noise ordinance. Ensure noise-generating construction activities (including truck deliveries, pile driving, and blasting) are limited to the least noise-sensitive times of day (e.g., weekdays during the daytime hours) for projects near sensitive receptors. Where construction activities are authorized outside the limits established by the noise element of the general plan or noise ordinance, notify affected sensitive noise receptors and all parties who will experience noise levels in access of the allowable limits for the specified land use, of the level of exceedance and duration of exceedance; and provide a list of protective measures that can be undertaken by the individual, including temporary relocation or use of hearing protective devices. NS-4 Limit speed and/or hours of operation of rail and transit systems during the selected periods of time to reduce duration and frequency of conflict with adopted limits on noise levels. NS-5 Post procedures and phone numbers at the construction site for notifying the Lead Agency staff, local Police Department, and construction contractor (during regular construction hours and off-hours), along with permitted construction days and hours, complaint procedures, and who to notify in the event of a problem. NS-6 Notify neighbors and occupants within 300 feet of the project construction area at least 30 days in advance of anticipated times when noise levels are expected to exceed limits established in the noise element of the general plan or noise ordinance. NS-7 Hold a preconstruction meeting with the job inspectors and the general contractor/onsite project manager to confirm that noise measures and practices (including construction hours, neighborhood notification, posted signs, etc.) are completed. NS-8 Designate an on-site construction complaint and enforcement manager for the project. NS-9 Ensure that construction equipment are properly maintained per manufacturers' specifications and fitted with the best available noise	

	suppression devices (e.g., mufflers, silencers, wraps). All intake and exhaust ports on power equipment shall be muffled or shielded. NS-10 Ensure that impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for project construction are hydraulically or electrically powered to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust can and should be used. External jackets on the tools themselves can and should be used, if such jackets are commercially available and this could achieve a reduction of 5 dBA. Quieter procedures can and should be used, such as drills rather than impact equipment, whenever such procedures are available and consistent with construction procedures. NS-11 Ensure that construction equipment is not idling for an extended time in the vicinity of noise-sensitive receptors. NS-12 Locate fixed/stationary equipment (such as generators, compressors, rock crushers, and cement mixers) as far as possible from noise-sensitive receptors. NS-13 Consider using flashing lights instead of audible back-up alarms on mobile equipment. NS-14 For projects that require pile driving or other construction techniques that result in excessive vibration, such as blasting, determine the potential vibration impacts to the structural integrity of the adjacent buildings within 50 feet of pile driving locations. NS-15 For projects that require pile driving or other construction techniques that result in excessive vibration, such as blasting, determine the threshold levels of vibration and cracking that could damage adjacent historic or other structure, and design means and construction methods to not exceed the thresholds. NS-16 For projects where pile driving would be necessary for construction due to geological conditions, utilize quiet pile driving techniques such as predrilling the piles to the maximum feasible depth, where feasible. Predrilling pile holes will reduce the number of blows required to completely seat the pile and will concentrate the pile	

	driving activity closer to the ground where pile driving noise can be shielded more effectively by a noise barrier/curtain. NS-17 For projects where pile driving would be necessary for construction due to geological conditions, utilize quiet pile driving techniques such as the use of more than one pile driver to shorten the total pile driving duration.	
SOLID AND HAZARDOUS WASTE		
Impacts from solid and hazardous waste generated by the increase in electrical vehicle use and air pollution control technology are less than significant.	None required.	Impacts remain less than significant.
Impacts from the solid and hazardous waste generated during construction are significant.	It is anticipated that most of the construction waste will be recycled due to their monetary value. No feasible mitigation measures have been identified.	Impacts remain significant and unavoidable.
Impacts from the solid and hazardous waste generated from vehicle and equipment scrapping are significant.	It is anticipated that most of the equipment and vehicles to be replaced will be recycled due to their monetary value. No feasible mitigation measures have been identified.	Impacts remain significant and unavoidable.
TRANSPORTATION AND TRAFFIC		
Impacts on traffic and circulation are significant.	TR-1 Develop a construction management plan that includes at least the following items and requirements, if determined to be feasible by the Lead Agency: • A set of comprehensive traffic control measures, including scheduling of major truck trips and deliveries to avoid peak traffic hours, detour signs if required, lane closure procedures, signs, cones for drivers, and designated construction access routes; • Notification procedures for adjacent property owners and public safety personnel regarding when major deliveries, detours, and lane closures will occur; • Location of construction staging areas for materials, equipment, and vehicles at an approved location;	Impacts remain significant and unavoidable.

	• A process for responding to and tracking complaints pertaining to construction activity, including identification of an onsite complaint manager. The manager shall determine the cause of the complaints and shall take prompt action to correct the problem. The Lead Agency shall be informed who the Manager is prior to the issuance of the first permit; • Provision for accommodation of pedestrian flow; • As necessary, provision for parking management and spaces for all construction workers to ensure that construction workers do not park in street spaces; • Any damage to the street caused by heavy equipment, or as a result of this construction, shall be repaired, at the project sponsor's expense, within one week of the occurrence of the damage (or excessive wear), unless further damage/excessive wear may continue; in such case, repair shall occur prior to issuance of a final inspection of the building permit. All damage that is a threat to public health or safety shall be repaired immediately. The street shall be restored to its condition prior to the new construction as established by the Lead Agency (or other appropriate government agency) and/or photo documentation, at the sponsor's expense, before the issuance of a Certificate of Occupancy; • Any heavy equipment brought to the construction site shall be transported by truck, where feasible; • No materials or equipment shall be stored on the traveled roadway at any time; • Prior to construction, a portable toilet facility and a debris box shall be installed on the site, and properly maintained through project completion; • All equipment shall be equipped with mufflers; • Prior to the end of each work-day during construction, the contractor or contractors shall pick up and properly dispose of all litter resulting from or related to the project, whether located on	

	the property, within the public rights-of-way, or properties of adjacent or nearby neighbors; and • Promote "least polluting" ways to connect people and goods to their destinations.	
Impacts to traffic and circulation on roadways and in the harbor are significant.	No feasible mitigation measures have been identified.	Impacts remain significant and unavoidable.
AESTHETICS		
Impacts from increasing glare are significant.	Ne feasible mitigation measures have been identified.	Impacts remain significant and unavoidable.
Impacts from construction are significant. catenary lines and use of bonnets at the Ports could degrade the visual	AE-1 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. AE-2 All construction, operation, and maintenance areas would be kept clean and tidy, including the re-vegetation of disturbed soil and storage of construction materials and equipment would be screened from view and/or are generally not visible to the public, where feasible.	Impacts remain significant and unavoidable.
Impacts from catenary lines and use of bonnets at the Ports could degrade the visual character or quality of a site and are significant.	AE-3 Siting projects and their associated elements next to important scenic landscape features or in a setting for observation from State scenic highways, national historic sites, national trails, and cultural resources should be avoided to the greatest extent feasible. AE-4 Apply development standards and guidelines to maintain compatibility with surrounding natural areas, including site coverage, building height and massing, building materials and color, landscaping, site grading, and so forth in accordance with general	Impacts remain significant and unavoidable.

	plans, master plans, and adopted design guidelines, where applicable. AE-5 To reduce glare, provide structural and/or vegetative screening from light-sensitive uses, where feasible.	

CHAPTER 2

PROJECT DESCRIPTION

2.1 Introduction

2.2 Background

2.3 Agency Authority

2.4 Project Location

2.5 Overall Attainment Strategy

2.6 Purpose of the 2016 AQMP

2.7 Project Objectives

2.8 Project Description

2.0 PROJECT DESCRIPTION

2.1 INTRODUCTION

The South Coast Air Quality Management District (SCAQMD or District) was created by the California legislature in 1977[1] as the public agency responsible for developing and enforcing air pollution control regulations in the South Coast Air Basin (Basin). The SCAQMD also includes portions of the Salton Sea Air Basin (SSAB) and Mojave Desert Air Basin (MDAB). The Lewis Air Quality Act (now known as the Lewis-Presley Air Quality Management Act) requires the SCAQMD to prepare and adopt an Air Quality Management Plan (AQMP) consistent with federal planning requirements. The 1977 amendments to the federal Clean Air Act (CAA) included requirements for submitting State Implementation Plans (SIPs) for nonattainment areas that fail to meet all federal ambient air quality standards (CAA § 172) and similar requirements exist in state law (Health & Safety Code §40462). The federal CAA was amended in 1990 to specify attainment dates and SIP requirements for ozone, carbon monoxide (CO), nitrogen dioxide (NO_2) and particulate matter with an aerodynamic diameter of less than 10 microns (PM10). In 1997, the United States Environmental Protection Agency (U.S. EPA) promulgated ambient air quality standards for particulate matter with an aerodynamic diameter less than 2.5 microns (PM2.5). The California Clean Air Act (CCAA), adopted in 1988, requires the SCAQMD to achieve and maintain state ambient air quality standards for ozone, CO, sulfur dioxide (SO_2), and NO_2 by the earliest practicable date (Health & Safety Code §40910). The CCAA also requires a three-year plan review and, if necessary, an update to the AQMP. The U.S. EPA is required to periodically update the national ambient air quality standards (NAAQS).

The 2016 AQMP identifies control measures and strategies to demonstrate that the region will attain the revoked 1997 8-hour ozone NAAQS (80 ppb) by 2024; the 2008 8-hour ozone standard (75 ppb) by 2032; the 2012 annual PM2.5 standard (12 ug/m3) by 2025; the 2006 24-hour PM2.5 standard (35 ug/m3) by 2019; and the revoked 1979 1-hour ozone standard (120 ppb) by 2023.

The Basin, which includes all of Orange County and the non-desert portions of Los Angeles, San Bernardino and Riverside counties, has one of the worst air quality problems in the nation. Though there have been significant improvements in air quality in the Basin over the last two decades, some ambient air quality standards are still exceeded relatively frequently and by a wide margin. The 2012 AQMP, submitted to the California Air Resources Board (CARB) for SIP inclusion in December 2012, concluded that further reductions in PM2.5 and oxides of nitrogen (NOx) emissions would be necessary to attain the air quality standards for 24-hour PM2.5 and 8-hour ozone by the dates mandated by federal law. Less emphasis was placed on emission reductions from volatile organic compounds (VOCs) because of the greater emphasis on NOx emission reductions, which is a precursor to ozone and PM2.5. Ozone, a criteria pollutant, is formed when VOCs react with NOx in the atmosphere. Ozone has been shown to adversely affect human health. NOx also contributes to the formation of PM2.5.

[1] The Lewis-Presley Air Quality Management Act, 1976 Cal. State. ch. 324 (codified at H & S Code, Sections 40400 - 40540).

2.2 BACKGROUND

The first AQMP was prepared and approved by the SCAQMD in 1979. The 2016 AQMP will be the eleventh plan prepared by the SCAQMD, not including certain SIPs for specific pollutants, e.g., PM10 for the Coachella Valley and the Basin, and CO and lead for Los Angeles County. The following bullets summarize the main components of the past AQMP updates and revisions:

- The 1982 AQMP was revised to reflect better data and modeling tools.

- In 1987, a federal court ordered the U.S. EPA to disapprove the 1982 AQMP because it did not demonstrate attainment of all NAAQS by 1987 as required by the CAA. This, in part, led to the preparation of the 1989 AQMP.

- The 1989 AQMP was adopted on March 17, 1989 and was specifically designed to attain all NAAQS. This plan called for three "tiers" of measures as needed to attain all standards and relied on significant future technology advancement to attain these standards.

- In 1991, the SCAQMD prepared and adopted the 1991 AQMP to comply with the CCAA.

- In 1992, the 1991 AQMP was amended to add a control measure containing market-based incentive programs (subsequently SCAQMD's Regional Clean Air Incentives Market (RECLAIM)).

- In 1994, the SCAQMD prepared and adopted the 1994 AQMP to comply with the CCAA three-year update requirement and to meet the federal CAA requirement for an ozone SIP. The AQMP, as adopted in 1994, included the following:

  - All geographical areas under the jurisdiction of the SCAQMD, compared to just the Basin;
  - The basic control strategies remained the same as in the earlier plans, although the three-tiered structure of control measures was replaced and measures previously referred to as Tier I, II, or III were replaced with short-/intermediate-term or long-term control measures;
  - Updated and refined control measures carried over from 1991;
  - Best Available Control Measure PM10 Plan;
  - The ozone attainment demonstration plan;
  - Amendments to the federal Reactive Organic Compound Rate-of-Progress Plan (also referred to as the VOC Rate-of-Progress Plan); and
  - Attainment Demonstration Plans for the federal PM10, NO2, and CO air quality standards; etc.

- The 1997 AQMP was designed to comply with the three-year update requirements specified in the CCAA as well as to include an attainment demonstration for PM10 as required by the federal CAA. Relative to ozone, the 1997 AQMP contained the following changes to the control strategies compared to the 1994 AQMP:

- Less reliance on transportation control measures (TCMs);
- Less reliance on long-term control measures that rely on future technologies as allowed under §182(e)(5) of the CAA; and
- Removal of other infeasible control measures and indirect source measures that had been substantially impacted by the state legislature in enacting new provisions in the Health and Safety Code.

- In 1999, the ozone plan portion of the 1997 AQMP was amended to address partial disapproval of the 1997 AQMP by the U.S. EPA and a settlement of litigation by environmental groups challenging the 1997 AQMP to provide the following:

  - Greater emission reductions in the near-term than would occur under the 1997 AQMP;
  - Early adoption of the measures that would otherwise be contained in the next three-year update of the AQMP; and
  - Additional flexibility relative to substituting new measures for infeasible measures and recognition of the relevance of cost effectiveness in determining feasibility.

- In April 2000, U.S. EPA approved the 1999 ozone SIP to the 1997 plan. The 1999 Amendment in part addressed the state's requirements for a triennial plan update.

- The 2003 AQMP was approved and adopted by the SCAQMD in August 2003. The 2003 AQMP was partially approved and partially disapproved by U.S. EPA, based on CARB's withdrawal of mobile source measures after the 1-hour ozone standard was revoked. The 2003 AQMP addressed the following control strategies:

  - Attaining the federal PM10 ambient air quality standard for the Basin and Coachella Valley - these portions were approved by the U.S. EPA: in both areas, the attainment demonstration was disapproved after CARB withdrew its measures;
  - Attaining the federal 1-hour ozone standard;
  - 1997/1999 control measures not yet implemented;
  - Revisions to the Post 1996 VOC Rate-of-Progress Plan and SIP for CO; and
  - Initial analysis of emission reductions necessary to attain the PM2.5 and 8-hour ozone standards.

- The SCAQMD Governing Board approved the 2007 AQMP for both ozone and PM10 on June 1, 2007. On September 27, 2007, CARB adopted the State Strategy for the 2007 SIP and the 2007 AQMP as part of the SIP. The 2007 SIP was then forwarded to U.S. EPA for approval. The following summarizes the major components of the 2007 AQMP:

  - The most current air quality setting at the time (i.e., 2005 data);
  - Updated emission inventories using 2002 as the base year, which also incorporated measures adopted since adopting the 2003 AQMP;

- ❑ Updated emission inventories of stationary and mobile on-road and off-road sources;
- ❑ 2003 AQMP control measures not yet implemented (eight of the control measures originally contained in the 2003 AQMP were updated or revised for inclusion into the 2007 AQMP);
- ❑ 24 new measures were incorporated into the 2007 AQMP based on replacing the SCAQMD's long-term control measures from the 2003 AQMP with more defined or new control measures and control measure adoption and implementation schedules;
- ❑ SCAQMD's recommended control measures to reduce emissions from sources that are primarily under state and federal jurisdiction, including on-road and off-road mobile sources, and consumer products;
- ❑ Southern California Association of Governments (SCAG)'s regional transportation strategy and control measures; and
- ❑ Analysis of emission reductions necessary and attainment demonstrations to achieve the federal 8-hour ozone and PM2.5 air quality standards.

- On November 22, 2010, U.S. EPA issued a notice of proposed partial approval and partial disapproval of the 2007 South Coast SIP for the 1997 Fine Particulate Matter Standards and the corresponding 2007 State Strategy. Specifically, U.S. EPA proposed approving the SIP's inventory and regional modeling analyses, but it also proposed disapproving the attainment demonstration because it relied too extensively on commitments to emission reductions in lieu of fully adopted, submitted, and SIP-approved rules. The notice also cited deficiencies in the SIP's contingency measures.

- In response to U.S. EPA's proposed partial disapproval of the 2007 SIP, on March 4, 2011, the SCAQMD Governing Board approved Revisions to the 2007 PM2.5 and Ozone SIP for the Basin and Coachella Valley. The revisions to the 2007 PM2.5 and Ozone SIP consisted of the following:

  - ❑ Updated implementation status of SCAQMD control measures necessary to meet the 2015 PM2.5 attainment date;
  - ❑ Revisions to the control measure adoption schedule;
  - ❑ Changes to the emission inventory resulting from CARB's December 2010 revisions to the on-road truck and off-road equipment rules; and
  - ❑ An SCAQMD commitment to its "fair share" of additional NOx emission reductions, if needed, in the event U.S. EPA does not voluntarily accept the "federal assignment."

- In response to the July 14, 2011 U.S. EPA notice of supplemental proposed partial approval and partial disapproval of the 2007 South Coast SIP for the 1997 Fine Particulate Matter Standards, at the October 7, 2011 public hearing, the SCAQMD Governing Board approved Further Revisions to PM2.5 and Ozone SIP for the Basin and Coachella Valley. Revisions to the PM2.5 SIP included a three-prong approach for identifying contingency measures needed to address U.S. EPA's partial disapproval:

  - ❑ Equivalent emissions reductions achieved through improvements in air quality;

- ❑ Relying on committed emissions reductions for the 2007 ozone plan; and
- ❑ Quantifying excess emissions reductions achieved by existing rules and programs that were not originally included in the 2007 PM2.5 SIP.

- U.S. EPA finalized a partial approval and partial disapproval on November 9, 2011. The disapproval was for the SIP's contingency measures and rejection of federal NOx emission reduction assignment.

- U.S. EPA fully approved the 2007 SIP for the 8-hour ozone standard on March 1, 2012.

- The SCAQMD Governing Board approved the 2012 AQMP on December 7, 2012. The 2012 AQMP was primarily designed to demonstrate attainment of the 2006 24-hour PM2.5 standard (35 ug/m3). The adopted Final 2012 AQMP was forwarded to CARB on December 20, 2012, with subsequent approval at its January 23, 2013, Board meeting. On February 1, 2013, the SCAQMD Governing Board approved Control Measure IND-01, Backstop Measure for Indirect Sources of Emissions from Ports and Port-Related Facilities, for inclusion in the Final 2012 AQMP. The following summarizes the major components of the 2012 AQMP:

  - ❑ The most current science and analytical tools;
  - ❑ A comprehensive strategy aimed at controlling pollution from stationary (point) sources, on-road and off-road mobile sources, and area sources;
  - ❑ Attainment demonstration of the federal 24-hour PM2.5 standard by 2014 in the Basin through adoption of control measures;
  - ❑ Update of the U.S. EPA approved 8-hour ozone control plan with new measures designed to reduce reliance on the CAA Section 182 (e)(5) long-term measures for NOx and VOC reductions;
  - ❑ Address several state and federal planning requirements, incorporating new scientific information, primarily in the form of updated emissions inventories, ambient measurements, and new meteorological air quality models;
  - ❑ Update on the air quality status of the SSAB in the Coachella Valley;
  - ❑ Discussion of the emerging issues of ultrafine particles and near-roadway exposures;
  - ❑ Analysis of the energy supply and demand issues that face the Basin and their relationship to air quality;
  - ❑ Demonstrations of 1-hour ozone attainment and vehicle miles travelled (VMT) emissions offsets, as per U.S. EPA requirements based on the recent court case of Association of Irritated Residents (AIR) vs. U.S. EPA (2012); and
  - ❑ Specific measures to further implement the ozone strategy in the 2007 AQMP.

- A Supplement to the 24-Hour PM2.5 (35 ug/m3) SIP was approved by the SCAQMD Governing Board on February 6, 2015. The purpose of the Supplement was to demonstrate attainment of the 2006 24-hour PM2.5 NAAQS by 2015 under the CAA (Title 1, Part D, Subpart 4) that had been required based on a recent court case. This plan included a discussion of the effects of the drought on the attainment date. New transportation conformity budgets for 2015 were also developed.

- The SCAQMD requested and received in January 2016 from the U.S. EPA a redesignation of the 24-hour PM2.5 standard to "serious" non-attainment area with a new attainment deadline of 2019.

- On April 14, 2016, U.S. EPA partially approved and partially disapproved the 2012/2015 PM2.5 and 2015 Supplement Plans. The U.S. EPA approved the following elements of the Plan: Emission inventories; demonstration that the South Coast cannot practicably attain by the Moderate area attainment date of December 31, 2015; the control strategy commitments; and the general conformity budgets. The U.S. EPA did not approved the following portions of the Plan: The demonstration that the Plan provides for the implementation of reasonably available control measures and reasonably available control technology due to deficiencies in the 2010 version of the area's RECLAIM included in the Plan; and the demonstration that the Plan provides for reasonably further progress. Furthermore, the U.S. EPA did not act on the motor vehicle emission budgets or the ports backstop measure.

- On August 24, 2016, the U.S. EPA released the final PM2.5 implementation rule that established PM2.5 planning requirements for states with areas that do not meet the NAAQS for PM2.5. This rule establishes plan requirements for plan due dates, attainment dates, emission inventories, attainment demonstrations, provisions for demonstrating reasonable further progress, milestones, contingency measures, and new source review requirements. It also responds to a January 2103 court decision of EPA's previous PM2.5 standards.

2.2.1 PROGRESS IMPLEMENTING THE 2007/2012 AQMP

The ozone portion of the 2007 AQMP has been approved by the U.S. EPA into the SIP. Certain of the "moderate" 24-hour PM2.5 elements of the 2012 AQMP have also been approved by the U.S. EPA, and in January 2016 the U.S. EPA approved the Basin's re-designation as a "serious" nonattainment area for PM2.5. These approvals include SIP revisions submitted in response to U.S. EPA's findings.

The District continues to implement the 2012 AQMP, which received a limited approval and limited disapproval by U.S. EPA on April 14, 2016. Table 2.2-1 summarizes the progress achieved toward fulfilling SCAQMD's emissions reductions commitments to attain the federal standards by the required dates. As shown in Table 2.2-1, for the control measures adopted by the District over this period, 11.7 tons per day of PM2.5 reductions were achieved by 2014 and 2.4 tons per day of VOC reductions and 19.5 tons per day of NOx reductions will be achieved by 2023. Other VOC control measures are undergoing rulemaking development and are on on track to achieve reductions.

TABLE 2.2-1

Total 2012 AQMP Emission Reductions
from SCAQMD Control Measures (tons/day)

	COMMITMENT		ACHIEVED	
Pollutant	**2014**	**2023**	**2014**	**2023**
VOC	0	5.8	0.4	2.4
NOx	2.0	10.7	0	19.5
PM2.5	11.7	--	11.7	--

Source: 2016 AQMP, Chapter 1, Table 1-1

2.3 AGENCY AUTHORITY

2.3.1 AGENCY AUTHORITY - 2016 AQMP

The 2016 AQMP sets forth emission reduction programs which require the cooperation of all levels of government: local, regional, state, and federal, as well as public engagement. Each level is represented in the AQMP by the appropriate agency or jurisdiction that has the authority over specific emissions sources. Accordingly, each agency or jurisdiction commits to specific planning and implementation responsibilities.

At the federal level, U.S. EPA is charged with establishing emission standards including motor vehicle standards; train, airplane, and ship pollutant exhaust and fuel standards; and regulation of non-road engines less than 175 horsepower. CARB, representing the state level, also oversees development of 2016 AQMP control measures for on-road vehicle emission standards in California; motor vehicle fuel specifications; some off-road source emission standards and fuel standards, including marine vessels; and consumer product standards. At the regional level, the SCAQMD is responsible primarily for non-vehicular sources and has limited authority over mobile sources (e.g., fleet regulations, incentives for accelerated vehicle turnover, reduction in average vehicle ridership, etc.). In addition, the SCAQMD has lead responsibility for developing stationary, some area, and indirect source control measures and coordinating the development and adoption of the 2016 AQMP. Lastly, at the local level, the cities and counties and their various departments (e.g., harbors and airports) have a dual role related to transportation and land use. Their efforts are coordinated through the regional metropolitan planning organization for the Basin, the SCAG, which is responsible for preparing the transportation control measure component of the 2016 AQMP. Interagency commitment and cooperation are keys to success of the 2016 AQMP.

2.3.2 AGENCY AUTHORITY - CEQA

California Environmental Quality Act (CEQA), Public Resources Code §21000 et seq., requires that the environmental impacts of proposed projects implemented or approved by governmental agencies be evaluated and that feasible methods to reduce, avoid or eliminate significant adverse impacts of these projects be identified and implemented. The lead agency is the “public agency that has the principal responsibility for carrying out or approving a project that may have a significant effect upon the environment" (Public Resources Code Section 21067). Since the SCAQMD has the primary responsibility for supervising or approving the entire project as a whole, it is the most appropriate public agency to act as lead agency (CEQA Guidelines Section 15051(b)).

A Program Environmental Impact Report (Program EIR) for the 2016 AQMP is considered to be the appropriate document pursuant to CEQA Guidelines Section 15168(a)(3), because the 2016 AQMP constitutes a series of actions that can be characterized as one large project and are related in the connection with the issuance or rules, regulations, plans, or other criteria to govern the conduct of a continuing program.

As the lead agency for the proposed 2016 AQMP, SCAQMD staff released the Notice of Preparation/Initial Study (NOP/IS) 2016 AQMP Program EIR on July 5, 2016 for a 30-day public review and comment period. A copy of the NOP/IS can be found in Appendix A. Comments and responses to comments received on the NOP/IS can be found in Appendix B.

2.4 PROJECT LOCATION

The SCAQMD has jurisdiction over an area of approximately 10,743 square miles, consisting of the four-county Basin, and the Riverside County portions of the SSAB and MDAB, referred to hereafter as the District. The Basin, which is a sub-region of the SCAQMD's jurisdiction, is bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto mountains to the north and east. It includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino counties. The Riverside County portion of the SSAB is bounded by the San Jacinto Mountains in the west and spans eastward up to the Palo Verde Valley. The federal nonattainment area (known as the Coachella Valley Planning Area) is a sub-region of the Riverside County and the SSAB that is bounded by the San Jacinto Mountains to the west and the eastern boundary of the Coachella Valley to the east (Figure 2.4-1).

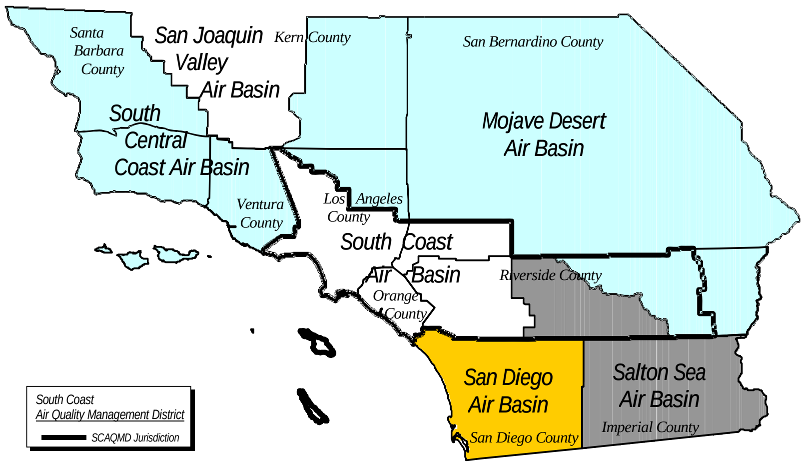


FIGURE 2.4-1

Southern California Air Basins

2.5 OVERALL ATTAINMENT STRATEGY

The overall control strategy for the 2016 AQMP is designed to meet applicable federal and state standards as follows:

- Revoked 1979 1-hour federal ozone standard (120 ppb) by 2023.
- Revoked 1997 8-hour federal ozone standard (80 ppb) by 2024;
- 2006 24-hour federal PM2.5 standard (35 µg/m3) by 2019;
- 2008 8-hour federal ozone standard (75 ppb) by 2032; and
- 2012 annual federal and state PM2.5 standards (12 µg/m3) by 2025.

The 2016 AQMP also discusses the recently adopted new federal 8-hour ozone standard (70 ppb), as well as incorporates toxics, climate change, energy, transportation, goods movement, infrastructure and other planning efforts that affect future air quality.

The proposed attainment strategy focuses on reduction of ozone precursors (NOx and VOC), direct PM2.5, and PM2.5 precursors (NOx and ammonia). NOx emissions lead to the formation of both ozone and PM2.5. Therefore, the most significant air quality challenge faced by the SCAQMD is to reduce NOx emissions sufficiently to meet the upcoming ozone and PM2.5 federal standard deadlines. The 2016 AQMP analyses indicate that an additional 43 percent

NOx emission reduction is needed in 2023 and 55 percent is needed in 2031 to attain the 8-hour ozone standard.

The majority of NOx emission reductions are expected to come from mobile sources. Mobile sources consist of two main categories: on-road mobile sources, which typically include automobiles, trucks, buses, and other vehicles that operate on public roadways; and off-road mobile sources, which include aircraft, ships, trains, and construction equipment that operate off public roadways. The authority to regulate mobile emission sources is divided between CARB and U.S. EPA.

The magnitude of emission reductions needed for the attainment of these NAAQS requires an aggressive mobile source control strategy supplemented with focused, strategic stationary source control measures and close collaboration with federal, state, and regional governments, local agencies, businesses, and the public. The 2016 AQMP uses a variety of implementation approaches such as accelerated deployment of available cleaner technologies (e.g., zero and near-zero emission technologies), best management practices (BMP), co-benefits from existing programs (e.g., greenhouse gas [GHG]), and incentive measures. Further demonstration and commercialization projects will be crucial to help deploy zero and near-zero emission technologies. Another key element to the 2016 AQMP implementation will be private and public funding to help further the development and deployment of advanced technology. Many of the same technologies will address both air quality and climate needs, such as increased energy efficiency. Without an adequate and fair-share level of reductions from all sources, the emissions reduction burden would be shifted to stationary sources, while mobile sources account for about 80 percent of the NOx emissions. The SCAQMD will continue to work closely with CARB to further control mobile source emissions where federal or state actions do not meet regional needs.

Implementation of the 2016 AQMP will be based on a series of control measures and strategies that vary by source type (i.e., mobile or stationary) as well as by the pollutant that is being addressed. Control measures were developed from a number of sources, including the AQMP Advisory Group, AQMP Control Strategy Symposium, Reasonably Available Control Technology (RACT) / Reasonable Available Control Measures Analysis (RACM), Best Available Control Technology (BACT) / Best Available Control Measures (BACM) analysis, (2016 AQMP, Appendix VI), SCAQMD staff and public input, and previous Plan proposals.

The control measures were developed based on technical and economic feasibility, as well as other factors such as promoting fair share responsibility for sources under different regulatory authorities and maximizing private/public partnerships. The following basic criteria were used in evaluating and selecting feasible control measures and establishing the proposed adoption schedule:

- Cost-Effectiveness: The cost of a control measure per reduction of emissions of a particular pollutant (cost includes purchasing, installing, operating, and maintaining the control technology).

- Emission Reduction Potential: The total amount of pollution that a control measure can feasibly reduce.

- Enforceability: The ability to ensure compliance with a control measure.
- Legal Authority: Ability of the SCAQMD or other adopting agency to legally implement the measure.
- Public Acceptability: The likelihood that the public will approve or cooperate in the implementation of a control measure.
- Rate of Emission Reduction: The time it will take for a control measure to reduce a certain amount of air pollution.
- Technological Feasibility: The likelihood that the technology for a control measure is or will be available.

2.6 PURPOSE OF THE 2016 AQMP

The 2016 AQMP will provide an updated air pollution control strategy to attain federal ambient air quality standards and has been developed as an integrated Plan taking into consideration: air quality improvement needs, climate change, transportation, and energy reliability. The proposed 2016 AQMP focuses on NOx reductions to attain ozone and PM2.5 standards identified in Section 2.5. The 2016 AQMP also includes ozone reduction strategies to make expeditious progress in attaining the federal and state standards not yet met (identified in Section 2.5).

It is expected that implementing the proposed 2016 AQMP control measures will provide substantial benefits of improved air quality. From a public health standpoint, air pollution has been linked to long-term health problems affecting the lungs, heart, blood, brain and immune and nervous systems. Therefore, improving air quality is expected to result in improvements to public health. Additional public welfare benefits include improved visibility, reduced destruction of materials and buildings, reduced damage to agricultural crops and habitat for wildlife and, more efficient land use patterns and transportation systems. The proposed 2016 AQMP control measures also have the potential to reduce reliance on traditional petroleum fuels, thus, providing reductions in GHG emissions. The following sections summarize the overall components of the 2016 AQMP and the specific control measures that comprise the 2016 AQMP.

2.7 PROJECT OBJECTIVES

CEQA Guidelines §15124(b) requires an EIR to include a statement of objectives, which describes the underlying purpose of the proposed project. The purpose of the statement of objectives is to aid the lead agency in identifying alternatives and the decision-makers in preparing a statement of findings and a statement of overriding considerations, if necessary. The objectives of the proposed 2016 AQMP are summarized in the following bullet points. These objectives may be refined or modified as part of the Program EIR preparation process.

1. Demonstrate attainment of the revoked 1-hour federal ozone standard (120 ppb) by 2022 with no reliance on future technology CAA §182(e)(5) measures.

2. Demonstrate attainment of the revoked 8-hour federal ozone standard (80 ppb) by 2023.
3. Demonstrate attainment of the 24-hour federal PM2.5 standard (35 μg/m3) in 2019.
4. Demonstrate attainment of the federal and state annual PM2.5 standards (12 μg/m3) by 2025.
5. Demonstrate attainment of the 8-hour federal ozone standard (75 ppb) by 2031.
6. Update planning assumptions and the best available information such as SCAG's 2016 Regional Transportation Plan (RTP), CARB's latest EMFAC2014 for the on-road mobile source emissions inventory, and CARB's OFF-ROAD 2011 model.
7. Update emission inventories using 2012 as the base year and incorporate emission reductions achieved from all applicable rules and regulations and the latest demographic forecasts.
8. Utilize SCAG's growth forecast to project future baseline emissions.
9. Update any remaining control measures from the 2012 AQMP and incorporate into the 2016 AQMP as appropriate.
10. Comply with federal contingency measure requirements.
11. Continue to work closely with businesses and industry groups to identify the most cost-effective and efficient path to meeting clean air goals while being sensitive to their economic concerns.
12. Eliminate reliance on future technology (CAA §182(e)(5)) measures to the extent feasible by providing specific control measures which have quantifiable emission reductions and associated cost.
13. Calculate and take credit for co-benefits from other planning efforts (e.g., GHG reduction targets, energy efficiency, and transportation).
14. Develop a strategy with fair-share emission reductions at the federal, state, and local levels.
15. Invest in strategies and technologies meeting multiple objectives regarding air quality, climate change, air toxics exposure, energy, and transportation.
16. Seek substantial funding for incentives to implement early deployment and commercialization of zero and near-zero technologies.
17. Enhance the socioeconomic analysis and pursue the most efficient and cost-effective path to achieve multi-pollutant and multi-deadline targets.
18. Prioritize regulatory opportunities and innovative non-regulatory "win-win" approaches for emission reduction.

2.8 PROJECT DESCRIPTION

The 2016 AQMP control measures consist of three main components: 1) the SCAQMD's Stationary and Mobile Source Control Measures; 2) state and suggested Federal Source Control Measures; and 3) RTP/SCS Control Measures provided by SCAG. These measures rely on not only the traditional command-and-control approach, but also public incentive programs, as well as advanced technologies expected to be developed and deployed in the next several years. A summary of these measures is provided in the following subsections. The following bullet points summarize the major components of the 2016 AQMP:

- The air quality baseline (i.e., 2012 data);
- Updated emission inventories using 2012 as the base year and measures implemented since adopting the 2012 AQMP;
- Future baseline emissions projected using SCAG's approved growth forecasts;
- New SCAQMD measures for stationary, area, and mobile sources to be incorporated into the 2016 AQMP;
- SCAG's 2016 RTP/SCS and related TCMs (2016 AQMP, Appendix IV-C);
- CARB's 2016 SIP Strategy;
- Analysis of emission reductions necessary to achieve the federal 8-hour ozone, 24-hour PM2.5, and annual PM2.5 air quality standards, as well as the (revoked) 1-hour ozone standard;
- Overview of state and federal CAA planning requirements; and
- Implementation schedule for adoption of the proposed control measures.

The 2016 AQMP relies on the regional demographic projections and transportation programs, measures, and strategies from SCAG's 2016 RTP/SCS. The RTP TCMs are required by Health and Safety Code 40460 to be combined with the SCAQMD's portion of the AQMP; however, the 2016 RTP/SCS is considered a separate project under CEQA because the land use and transportation strategies program are within SCAG's jurisdictional authority and the 2016 RTP/SCS will move forward with or without adoption of the 2016 AQMP. The environmental impacts from the 2016 RTP/SCS were analyzed and disclosed in the Draft Program EIR released by SCAG on December 4, 2015 for a 60-day public review and comment period ending on February 1, 2016. On April 7, 2016, the SCAG Regional Council adopted the 2016 RTP/SCS and certified the Final Program EIR. Since SCAQMD will not be adopting rules or regulations to implement the TCMs and the two projects are not dependent on each other, the environmental impacts from the 2016 RTP/SCS were only analyzed as part of the cumulative analysis.

The project-specific environmental impacts from implementing CARB's mobile source control measures were analyzed herein as SCAQMD is expected to enter into rulemaking to implement CARB's strategies within the District. Furthermore, at the time of release of the Draft Program EIR, the environmental impacts associated with CARB's SIP strategy were not fully evaluated under CEQA.

2.8.1 SCAQMD STATIONARY SOURCE CONTROL MEASURES

The stationary source control measures included in the 2016 AQMP would further reduce emissions from both point sources (permitted facilities) and area sources (generally small and non-permitted sources). These measures target a number of source categories, including Energy and Climate Change Programs (ECC), Combustion Sources (CMB), Petroleum Operations and Fugitive VOC Emissions (FUG), Coatings and Solvents (CTS), Multiple Component Sources (MCS), Best Control Measures (BCM), and Compliance Flexibility Programs (FLX). Each control measure may rely on a number of control methods. Table 2.8-1 provides a list of the SCAQMD proposed ozone measures for stationary sources along with the anticipated adoption date, implementation period, and emission reductions. These control measures are further categorized by the type of the measures, for example, recognition of co-benefits or incentives. Some VOC measures recognize co-benefit VOC reductions from other NOx or PM2.5 measures. Limited, strategic VOC control measures are also proposed.

TABLE 2.8-1

SCAQMD Proposed Stationary Source 8-Hour Ozone Control Measures

Number	Title	Adoption	Implementation Period	Implementing Agency	Emission Reductions (tons/day) (2023/2031)
SCAQMD Stationary Source NOx Measures					
Stationary Source Regulatory Measures:					
CMB-03	Emission Reductions from Non-Refinery Flares [NOx, VOC]	2017	2020	SCAQMD	1.4 / 1.5
CMB-04	Emission Reductions from Restaurant Burners and Residential Cooking [NOx]	2018	2022	SCAQMD	0.8 / 1.6
CMB-05	Further NOx Reductions from RECLAIM Assessment [NOx]	2022	2023–2031	SCAQMD	0 / 5
Recognition of Co-Benefits:					
ECC-01	Co-Benefit Emission Reductions from GHG Programs, Policies, and Incentives [All Pollutants]	N/A	Ongoing	Various Agencies	TBD [a]
ECC-02	Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures [NOx, VOC]	N/A	Ongoing	SCAQMD	0.3 / 1.1
ECC-04	Reduced Ozone Formation and Emission Reductions from Cool Roof Technology [All Pollutants]	N/A	Ongoing	SCAQMD, CEC	TBD [a]
Incentive-Based Measures:					
ECC-03	Additional Enhancements in Reducing Existing Residential Building Energy Use [NOx, VOC]	N/A	Ongoing	SCAQMD	1.2 / 2.1
CMB-01	Transition to Zero and Near-Zero Emission Technologies for Stationary Sources [NOx, VOC]	N/A	Ongoing	SCAQMD	2.5 / ~~5~~6
CMB-02	Emission Reductions from Commercial and Residential Space and Water Heating [NOx]	2018	2020–2031	SCAQMD	1.1 / ~~1.5~~ 2.8
Other Measures:					
FLX-01	Improved Education and Public Outreach [All Pollutants]	N/A	Ongoing	SCAQMD, Other Parties	N/A [b]
MCS-01	Improved Breakdown Procedures and Process Re-Design [All Pollutants]	TBD	TBD	SCAQMD	N/A [b]
MCS-02	Application of All Feasible Measures [All Pollutants]	TBD	TBD	SCAQMD	TBD [a]

TABLE 2.8-1 (CONCLUDED)

SCAQMD Proposed Stationary Source 8-Hour Ozone Control Measures

Number	Title	Adoption	Implementation Period	Implementing Agency	Emission Reductions (tons/day) (2023/2031)
SCAQMD Stationary Source VOC Measures					
VOC Control Measures:					
FUG-01	Improved Leak Detection and Repair [VOC]	2019	2022	SCAQMD	2 / 2
CTS-01	Further Emission Reductions from Coatings, Solvents, Adhesives, and Sealants [VOC]	2017/2021	2020–2031	SCAQMD	1 / 2
FLX-02	Stationary Source VOC Incentives [VOC]	N/A	Ongoing	SCAQMD	TBD[a]
Corresponding VOC Reductions from NOx and PM Measures:					
ECC-02	Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures [NOx, VOC]	N/A	Ongoing	SCAQMD	0.07 / 0.29 [c]
ECC-03	Additional Enhancements in Reducing Existing Residential Building Energy Use [NOx, VOC]	N/A	Ongoing	SCAQMD	0.2 / 0.3 [c]
CMB-01	Transition to Zero and Near-Zero Emission Technologies for Stationary Sources [NOx, VOC]	N/A	Ongoing	SCAQMD	~~0.9 / 1.8~~ [c] <u>1.2 / 2.8</u>
CMB-03	Emission Reductions from Non-Refinery Flares [NOx, VOC]	2017	2020	SCAQMD	~~1.7 / 1.8~~ [c] <u>0.4 / 0.4</u>
BCM-10	Emission Reductions from Greenwaste Composting [VOC, NH3]	TBD	TBD	SCAQMD	1.5 / 1.8 [c]

[a] TBD are reductions to be determined once the inventory and control approach are identified, and are not relied upon for attainment demonstration purposes.

[b] N/A are reductions that cannot be quantified due to the nature of the measure (e.g., outreach) or if the measure is designed to ensure reductions that have been assumed to occur will in fact occur.

[c] Corresponding VOC reductions from other measures.

Source: 2016 AQMP, Table 4-2.

The following text provides a brief description of the proposed control measures presented in Table 2.8-1.

2.8.1.1 Stationary Source Regulatory Measures

There are three additional stationary source measures for NOx. The first measure seeks to reduce NOx and utilize excess gas from non-refinery flares, the second measure would seek reductions from commercial restaurant burners and residential cooking appliances, and the third measure would involve suggested actions for REgional CLean Air Incentives Market (RECLAIM) program assessment.

CMB-03 – EMISSION REDUCTIONS FROM NON-REFINERY FLARES: Flare NOx emissions are regulated through new source review and BACT, but there are currently no source-specific rules regulating NOx emissions from existing flares at non-refinery sources, such as organic liquid loading stations, tank farms, and oil and gas production. This control measure proposes that, consistent with the all feasible control measures, all non-refinery flares meet current BACT for NOx emissions and thermal oxidation of VOCs. The preferred method of control would involve capturing the gas that would typically be flared and converting it into an energy source (e.g., transportation fuel, fuel cells). If gas recovery is not cost-effective or feasible, the installation of newer flares implementing BACT will be considered.

CMB-04 – EMISSION REDUCTIONS FROM RESTAURANT BURNERS AND RESIDENTIAL COOKING: This control measure applies to retail restaurants and quick service establishments utilizing commercial cooking ovens, ranges and charbroilers by funding development of, promoting and incentivizing the use and installation of low-NOx burner technologies. In addition, the SCAQMD would consider developing a manufacturer based rule to establish emission limits for cooking appliances used by restaurants and residential applications. Finally, co-benefit reductions will be sought through existing or enhanced energy efficiency programs being implemented by other entities.

CMB-05 – FURTHER NOX REDUCTIONS FROM RECLAIM ASSESSMENT: The California Health and Safety Code requires the SCAQMD to implement BARCT in the RECLAIM program as well as other stationary sources, and if BARCT advances, the SCAQMD is required to periodically re-assess the overall facility caps, and reduce the RECLAIM Trading Credit (RTC) holdings to a level equivalent to command-and-control BARCT levels. The emission reductions resulting from the programmatic RTC reductions will help the Basin attain the NAAQS for ozone and PM2.5 as expeditiously as practicable. When considering future emission reductions for AQMP purposes, the NOx RECLAIM program works differently than traditional command-and-control regulations. When projecting future emissions for SIP purposes, all RECLAIM holdings must be assumed to be emitted in the air. Under command-and-control regulations, future year emissions estimates for many sources are based on actual emissions in a base year which are then projected into the future using the best available estimates of economic growth for a particular industry. The RECLAIM program has traditionally, and perhaps necessarily, included more RTCs than actual emissions. This margin may be needed for market liquidity, but also precludes taking future year SIP credit for these unused credits. For attainment demonstration purposes, these emission reductions would then need to be achieved from non-RECLAIM sources. This control measure identifies a series of approaches, assessments, and analyses that can be explored to make the program more effective in ensuring equivalency with command and control regulations implementing BARCT, and to potentially generate further NOx emission reductions at RECLAIM facilities.

2.8.1.2 Recognition of Co-Benefits

This category includes three proposed emission reduction measures that recognize emission reductions from energy and climate change related programs that consist of general GHG programs, existing residential and commercial building energy efficiency improvement, and cool roof technology.

ECC-01 – CO-BENEFIT EMISSION REDUCTIONS FROM GHG PROGRAMS, POLICIES, AND INCENTIVES: Combustion sources that emit GHGs are typically sources of criteria pollutants. Significant efforts are currently being planned and implemented to reduce GHG emissions under the State's 2020, 2030 and 2050 targets. As these GHG reduction efforts continue across multiple sectors, the reductions of criteria pollutants should be considered along with any additional enhancements needed to achieve further criteria pollutant reductions under the GHG programs. Existing and further GHG emission reductions mechanisms, including market programs, renewable energy targets, incentive and rebate programs, and promoting implementation and development of new technologies, would be evaluated and refined to maximize criteria pollutant emission reductions.

ECC-02 – CO-BENEFITS FROM EXISTING RESIDENTIAL AND COMMERCIAL BUILDING ENERGY EFFICIENCY MEASURES: This control measure would seek to account for criteria pollutant co-benefits from the implementation of required energy efficiency mandates such as California's Title 24 program and SB 350 (Clean Energy Pollution Reduction Act). The 2020 target for Title 24 will be to achieve net zero energy consumption from new residential buildings by utilizing new building materials and more efficient appliances. SB 350 doubles the additional achievable energy efficiency savings in electricity and natural gas energy uses in existing buildings and increases renewable energy sources as a share of a utility's power sources from 33 to 50 percent by 2030. This control measure will take advantage of the co-benefit emission reductions from implementation of these state regulations.

ECC-04 – REDUCED OZONE FORMATION AND EMISSION REDUCTIONS FROM COOL ROOF TECHNOLOGY: Cool roofs reflect a higher fraction of incident sunlight than traditional roofing materials. Widespread adoption of cool roofs can mitigate the urban heat island effect and can lower daytime ambient temperatures, thus slowing the rate of ozone formation. In addition, buildings equipped with cool roofs require less electricity for cooling, leading to reductions in emissions from the power generation sector. This control measure has the potential to reduce ambient ozone concentrations directly along with NOx, CO, PM, and CO2 emissions from the power generation sector. Evaporative VOC emissions will be reduced due to lower ambient temperatures in the urban areas of the Basin. However, ultra-violet solar energy can also be reflected, leading to increased ozone formation in the air column above the building. Depending on the extent of this potential adverse impact, additional physical property requirements on cool roof materials may be necessary. Three possible aspects of cool roof technology, including solar reflectance, radiative properties, and roof replacements will be incorporated into a technical modeling analysis to quantify the impact of this control measure on air quality.

2.8.1.3 Incentive-Based Measures

The 2016 AQMP includes voluntary incentive measures that are part of the overall Plan to satisfy the CAA emission reduction requirements needed to achieve attainment of the federal ozone standards in 2023 and 2031. Prior AQMPs relied primarily on the adoption of rules to implement the measures provided in those AQMPs. Such regulations involve mandatory requirements and result in generally straightforward and enforceable reductions. With heavy reliance on voluntary incentive measures to achieve attainment of the federal air quality standards, the SCAQMD must design programs such that the emission reductions from these incentive measures are proven to be real, quantifiable, surplus, enforceable, and permanent in order for U.S. EPA to approve the emission reduction as part of the Plan.

There are key components required of a SIP submittal in order to rely on discretionary incentive programs to satisfy the CAA emission reduction requirements. The components include a demonstration satisfying "integrity elements," an enforceable commitment, technical support, funding, legal authority, public disclosure and provisions to track results in accordance with U.S. EPA's economic incentive programs (EIP) guidelines.[2] The following lists the necessary elements that will be included in each of the incentive measures:

- Integrity Elements
- Commitment (Federal Enforceability)
- Technical Analyses
- Funding
- Resources
- Outreach and Public Disclosure
- Legal Authority

This category includes three proposed incentive-based measures for additional enhancements in building energy efficiency, facility modernization, and commercial and multi-unit residential space and water heating. These measures may partially or exclusively rely on incentives to achieve NOx reductions from the corresponding emission sources.

ECC-03 – ADDITIONAL ENHANCEMENTS IN REDUCING EXISTING RESIDENTIAL BUILDING ENERGY USE: This control measure would seek to provide incentives to go beyond the goals within ECC-02 and CMB-02. Incentive programs would be developed for existing residences that include weatherization, upgrading older appliances with highly efficient technologies and renewable energy sources to reduce energy use for water heating, lighting, cooking and other large residential energy sources. Incorporating newer, efficient appliance technologies, weatherization measures along with renewables such as solar thermal and solar photovoltaics can provide emission reductions within the residential sector above current SCAQMD and state regulations along with reduced energy costs.

[2] References:

- "Guidance on Incorporating Voluntary Mobile Source Emission Reduction Programs in SIPs," October 24, 1997.
- "Improving Air Quality with Economic Incentive Programs," January 2001.
- "Guidance on SIP Credits for Emission Reductions from Electric-Sector Energy Efficiency and Renewable Energy Measures," August 5, 2004.
- "Incorporating Emerging and Voluntary Measure in a SIP," October 4, 2004.
- "Guidance on Incorporating Bundled Measures in a SIP" August 16, 2005.
- "Roadmap for Incorporating Energy Efficiency/Renewable Energy Policies and Programs into State and Tribal Implementation Plans," July 2012.
- "Diesel Retrofits: Quantifying and Using Their Emission Benefits in SIPs and Conformity: Guidance for State and Local Air and Transportation Agencies," February 2014.

CMB-01 – TRANSITION TO ZERO AND NEAR-ZERO EMISSION TECHNOLOGIES FOR STATIONARY SOURCES: This proposed control measure would seek emission reductions of NOx from traditional combustion sources by replacement with zero and near-zero emission technologies including low NOx emitting equipment, electrification, alternative process changes, efficiency measures, or fuel cells for combined heating and power (CHP). Replacing older higher-emitting equipment with newer lower or zero-emitting equipment can apply to a single source or an entire facility. These sources include engines, turbines, microturbines, and boilers that generate power for electricity for distributed generation, facility power, process heating, and/or steam production. New businesses can be required or incentivized to install and operate zero-emission equipment, technology and processes beyond the current BACT requirements. Fuel cells are also an alternative to traditional combustion methods, resulting in a reduction of NOx emissions with the co-benefit of reducing other criteria air pollutants and GHGs. This control measure would also seek energy storage systems and smart grid control technologies that provide a flexible and dispatchable resource with zero emissions. Grid based storage systems can replace the need for new peaking generation, be coupled with renewable energy generation, and reduce the need for additional energy infrastructure. Mechanisms will be explored to incentivize businesses to choose the cleanest technologies as they replace equipment and upgrade facilities, and to provide incentives to encourage businesses to move into these zero and near-zero emission technologies sooner.

CMB-02 – EMISSION REDUCTIONS FROM COMMERCIAL AND RESIDENTIAL SPACE AND WATER HEATING: This control measure seeks annual average NOx emission reductions from unregulated commercial space heating furnaces and from incentive programs to replace existing older boilers, water heaters, and space heating furnaces. This control measure will apply to manufacturers, distributors, sellers, installers and purchasers of commercial boilers, water heaters and furnaces used for heating. The control measure has two components. The first component is to continue to implement the Rule 1111 emission limit of NOx for residential space heaters which is 14 ng/J (20 ppm) starting in 2014. The second component is to incentivize the replacement of older boilers, water heaters and space heaters with newer and more efficient low NOx boilers, water heaters and space heaters, and/or "green technologies" such as solar heating or heat pumps. The new boilers and water heaters would comply with SCAQMD rule emission limits and new space heaters would meet a specified emission limit. If required, the SCAQMD will consider amending Rules 1121 and 1111 to put in place a heat input based emission limit which will result in lower NOx emissions for high efficiency units compared with standard efficiency units. Because of the rules' heat output based limits, high efficiency water heaters and furnaces emit the same amount of NOx per day as standard efficiency units. In addition, the SCAQMD will also consider developing a rule to limit NOx emissions from those commercial and residential heating furnaces which are currently unregulated.

2.8.1.4 Other Measures

There are three proposed measures in this category. One measure seeks improved education and public outreach. The next measure proposes breakdown limitations to be consistent with federal requirements. The third measure involves implementation of all feasible measures for stationary sources consistent with state law.

FLX-01 – IMPROVED EDUCATION AND PUBLIC OUTREACH: This proposed control measure seeks to provide education, outreach, and incentives for consumers and businesses to contribute to clean air efforts. Examples include consumer choices such as the use of energy efficient products, new lighting technology, "super-compliant" coatings, tree planting, and the use of lighter colored roofing and paving materials, which reduce energy usage by lowering the ambient temperature. In addition, this proposed measure intends to increase the effectiveness of energy conservation programs through public education and awareness as to the environmental and economic benefits of conservation. Educational and incentive tools to be used include social comparison applications (comparing your personal environmental impacts with other individuals), social media, and public/private partnerships.

This control measure is a voluntary program that provides education and outreach to consumers, business owners, and residences regarding the benefits of making clean air choices in purchases, conducting efficiency upgrades, installing clean energy sources, and approaches to conservation. These efforts will be complemented with currently available incentive programs and developing additional incentive programs. Lastly, the SCAQMD staff may develop an EIP to offer technical and financial assistance to help implement efficiency measures and other low emission technologies.

MCS-01 – IMPROVED BREAKDOWN PROCEDURES AND PROCESS RE-DESIGN: SCAQMD Rule 430 applies to breakdowns that result in a violation of any rule or permit condition, with some exceptions. U.S. EPA's May 2015 final action on startups, shutdowns, and malfunctions (SSM) stipulates that exemptions from emission limits during periods of breakdown are not allowed. This control measure would introduce breakdown limits and procedures and potential process re-designs that would apply to breakdowns from all emission sources, providing pollutant concentration or emission limits to comply with U.S. EPA's SSM policy, as applicable.

MCS-02 – APPLICATION OF ALL FEASIBLE MEASURES: This control measure is to address the state law requirement for all feasible measures for ozone. Existing rules and regulations for pollutants such as VOC, NOx, SOx and PM reflect current BARCT. However, BARCT continually evolves as new technology becomes available that is feasible and cost-effective. The SCAQMD staff will continue to review new emission limits or controls introduced through federal, state or local regulations to determine if SCAQMD regulations remain equivalent or more stringent than rules in other regions. If not, a rulemaking process will be initiated to perform a BARCT analysis with potential rule amendments if deemed feasible. In addition, the SCAQMD will consider adopting and implementing new retrofit technology control standards, based on research and development and other information, that are feasible and cost-effective.

2.8.1.5 VOC Control Measures

This category seeks limited, strategic VOC controls that contribute to controlling ozone levels in the Basin. The first measure utilizes more advanced, fugitive VOC leak detection systems. The second measure targets limited reductions of VOC emissions from VOC-containing products such as coatings, solvents, adhesives, and lubricants, or utilization of alternative products/equipment. The last measure proposes to incentivize efficient clean equipment purchases, efficiency projects, and conservation techniques that lead to VOC and other emission reductions.

FUG-01 – IMPROVED LEAK DETECTION AND REPAIR: This control measure seeks to reduce emissions from a variety of VOC emission sources including, but not limited to, oil and gas production facilities, petroleum refining and chemical products processing, storage and transfer facilities, marine terminals, and other sources, where VOC emissions occur from fugitive leaks in piping components, wastewater system components, and process and storage equipment leaks. Most of these facilities are required under SCAQMD and federal rules to maintain a leak detection and repair (LDAR) program that involves individual screening of all of their piping components and periodic inspection programs of equipment to control and minimize VOC emissions. This measure would utilize advanced remote sensing techniques (Smart LDAR), such as Fourier transform infrared spectroscopy, Ultraviolet Differential Optical Absorption Spectroscopy, Solar Occultation Flux, and infrared cameras, that can identify, quantify, and locate VOC leaks in real time allowing for faster repair in a manner that is less time consuming and labor intensive than traditional LDAR.

This control measure would pursue two goals. The first is to upgrade a series of SCAQMD's inspection/maintenance rules (Rules 462, 1142, 1148.1, 463, 1178, 1173, and 1176) to require, at a minimum, a self-inspection program, or utilization of an optical gas imaging-assisted LDAR program where feasible. The second is to explore the use of new technologies to detect and verify VOC fugitive emissions in order to supplement existing programs and achieve additional emission reductions.

For new detection technology this control measure will be implemented in two phases: Phase I will be a pilot LDAR program to demonstrate feasibility with the new technology and to establish implementation protocols. The completion of Phase I will result in the identification of facilities/industries currently subject to LDAR programs and identification of those where the new technology is not yet ready to be utilized. Based on the results of Phase I, fugitive VOC rules will be amended as appropriate under the subsequent phase (Phase II) to enhance their applicability and effectiveness, and to further achieve emission reductions.

CTS-01 – FURTHER EMISSION REDUCTIONS FROM COATINGS, SOLVENTS, ADHESIVES, AND SEALANTS: This control measure seeks limited VOC emission reductions by focusing on select coating, adhesive, solvent and sealant categories by further limiting the allowable VOC content in formulations or incentivizing the use of super-compliant technologies. Examples of the categories to be considered include, but are not limited to, coatings used in aerospace applications, adhesives used in a variety of sealing applications, solvents for graffiti abatement activities. Reductions could be achieved by lowering the VOC content of a few categories within SCAQMD source-specific Rules 1113, 1124, 1144, 1168, and 1171 where possible, especially where the majority of products already meet lower limits. For solvents, reductions could be achieved by promoting the use of alternative low-VOC products or non-VOC product/equipment at industrial facilities. The tightening of regulatory exemptions can also lead to reduced emissions across multiple use categories.

FLX-02 – STATIONARY SOURCE VOC INCENTIVES: This control measure seeks to incentivize VOC emission reductions from various stationary sources through incentive programs for the use of clean, low VOC emission technologies. Facilities would be able to qualify for incentive funding if they utilize equipment or accept permit conditions which result in cost-effective emission reductions that are beyond existing requirements. The program would establish procedures for quantifying emission benefits from clean technology implementation and develop cost-effectiveness thresholds for funding eligibility. Mechanisms will be explored to incentivize businesses to choose the cleanest technologies as they replace equipment and upgrade facilities, and to provide incentives to encourage businesses to move into these technologies sooner. For stationary sources, the SCAQMD staff has compiled an initial list of potential incentives to encourage businesses to use zero- or near-zero technologies or enhancements to the SCAQMD's existing programs to reduce or eliminate barriers to implement state of the art technologies. Potential incentive concepts include incentive funding, permitting and fee incentives and enhancements, New Source Review (NSR) incentives and enhancements, branding incentives, and recordkeeping and reporting incentives. The SCAQMD staff is committed to further investigating these concepts.

2.8.1.6 Corresponding VOC Reductions from NOx and PM Measures

The following four measures recognize corresponding VOC reductions from other measures designed to achieve NOx and NH3 reductions.

ECC-02 – CO-BENEFITS FROM EXISTING RESIDENTIAL AND COMMERCIAL BUILDING ENERGY EFFICIENCY MEASURES: This control measure would seek to account for criteria pollutant co-benefits from the implementation of required energy efficiency mandates such as California's Title 24 program and SB 350 (Clean Energy Pollution Reduction Act). The 2020 target for Title 24 will be to achieve net zero energy consumption from new residential buildings utilizing new building materials and more efficient appliances. SB 350 doubles the additional achievable energy efficiency savings in electricity and natural gas energy uses in existing buildings and increases renewable energy sources as a share of a utility's power sources from 33 to 50 percent by 2030. This control measure will take advantage of the co-benefit VOC emission reductions from implementation of these State regulations.

ECC-03 – ADDITIONAL ENHANCEMENTS IN REDUCING EXISTING RESIDENTIAL BUILDING ENERGY USE: This control measure would seek to provide incentives to go beyond the goals within ECC-02 and CMB-02. Incentive programs would be developed for existing residences that include weatherization, upgrading older appliances with highly efficient technologies and renewable energy sources to reduce energy use for water heating, lighting, cooking and other large residential energy sources. Incorporating newer, efficient appliance technologies, weatherization measures along with renewables such as solar thermal and solar photovoltaics can provide emission reductions within the residential sector above current SCAQMD and State regulations along with reduced energy costs.

CMB-01 – TRANSITION TO ZERO AND NEAR-ZERO EMISSION TECHNOLOGIES FOR STATIONARY SOURCES: This proposed control measure would seek corresponding VOC reductions from NOx-focused measures addressing traditional combustion sources by replacement with zero and near-zero emission technologies including low NOx emitting equipment, electrification, alternative process changes, efficiency measures, or fuel cells for CHP. Replacing older higher-emitting equipment with newer lower or zero-emitting equipment can apply to a single source or an entire facility. These sources include engines, turbines, microturbines, and boilers that generate power for electricity for distributed generation, facility power, process heating, and/or steam production. New businesses can be required or incentivized to install and operate zero-emission equipment, technology and processes beyond the current BACT requirements. Fuel cells are also an alternative to traditional combustion methods, resulting in a reduction of NOx emissions with the co-benefit of reducing VOCs and GHGs. This control measure would also seek energy storage systems and smart grid control technologies that provide a flexible and dispatchable resource with zero emissions. Grid based storage systems can replace the need for new peaking generation, be coupled with renewable energy generation, and reduce need for additional energy infrastructure. Mechanisms will be explored to incentivize businesses to choose the cleanest technologies as they replace equipment and upgrade facilities, and to provide incentives to encourage businesses to move into these zero and near-zero emission technologies sooner.

BCM-10 – EMISSION REDUCTIONS FROM GREENWASTE COMPOSTING: VOCs and ammonia, which are PM precursor gases, are emitted from composting of organic waste materials including greenwaste and foodwaste and are currently regulated by existing SCAQMD Rule 1133.3. Although Rule 1133.3 covers foodwaste composting, the level of emissions from foodwaste composting has not been fully characterized, mainly due to the lack of related emissions test data. This control measure proposes potential emission minimization through emerging organic waste processing technology and potential emission reductions through restrictions on the direct land application of chipped and ground uncomposted greenwaste and through increased diversion to anaerobic digestion. This proposed control measure includes a 15-day pathogen reduction process of chipped and ground uncomposted greenwaste with composting BMPs to reduce potential VOC and ammonia emissions from land applied greenwaste.

2.8.2 SCAQMD MOBILE SOURCE CONTROL MEASURES

SCAQMD staff analyzed the need to accelerate the penetration of cleaner engine technologies and assist in implementing CARB's proposed mobile source strategy. Specifically, there are several measures under CARB's proposed mobile source strategy that are title "Further Deployment of Cleaner Technologies" (see Appendix IV-A and IV-B, 2016 AQMP), which identifies the SCAQMD as an implementing agency along with CARB and U.S. EPA. CARB indicated that the implementation of the "Further Deployment" measures is based on a combination of incentives funding, development of regulations, and quantification of emission reduction benefits from operational efficiency actions and deployment of autonomous vehicles, connected vehicles, and intelligent transportation systems. As such, the SCAQMD mobile source measures proposed in this Appendix will help implement the "Further Development" measures. In addition, the SCAQMD is implementing several incentives funding programs that have resulted in early emission reductions (e.g., the Carl Moyer Memorial Air Quality Standards Attainment Program, the Surplus Off-Road Opt-In for NOx (SOON) program, and Proposition 1B – Goods Movement Emissions Reduction Program). The emission reduction benefits of the funding programs are quantified and are proposed to be included as part of the overall emission reductions for attainment of the NAAQS.

The proposed SCAQMD mobile source measures are based on a variety of control technologies that are commercially available and/or technologically feasible to implement in the next several years. The focus of these measures includes accelerated retrofits or replacement of existing vehicles or equipment, acceleration of vehicle turnover through voluntary vehicle retirement programs, and greater use of cleaner fuels in the near-term. The measures will encourage greater deployment of commercially-available zero-emission vehicle and equipment technologies such as plug-in hybrids, battery-electric, and fuel cells to the maximum extent feasible as such technologies are commercialized and near-zero emission technologies everywhere else. In the longer-term, there is a need to significantly increase the penetration and deployment of near-zero and zero-emission vehicles (ZEVs), greater use of cleaner, renewable fuels (either alternative fuels or new formulations of gasoline and diesel fuels), and additional emission reductions from federal and international sources such as locomotives, ocean-going vessels, and aircraft.

In implementing the SCAQMD mobile source measures, the SCAQMD will focus on collaborative approaches to achieve additional emission reductions to help implement the proposed State ”Further Deployment” measures. During the public process, SCAQMD staff will assess the progress in identifying actions (voluntary and regulatory) that will result in additional emission reductions. SCAQMD staff will report to the Governing Board on the progress on a routine basis, but no later than six months after the adoption of the Final 2016 AQMP. If progress is not made in identifying specific actions within one year from adoption of the Final 2016 AQMP, the SCAQMD staff will recommend to the Governing Board to consider proceeding with the development of rules or other enforceable mechanisms within its existing legal authority or seek additional authority to adopt and implement measures to cost-effectively reduce mobile source emissions. Such authority includes development of new or expanding existing clean vehicle fleet rules or indirect source regulations.

A total of 15 measures are proposed as actions to reduce mobile source emissions. One measure is proposed to identify actions to help mitigate and potentially provide emission reductions due to new development and redevelopment projects. Four measures seek to identify actions that will result in additional emission reductions at commercial marine ports, rail yards and intermodal facilities, warehouse distribution centers, and commercial airports to help meet the emission reductions associated with the State Mobile Source Strategy “Further Deployment” measures for on-road heavy-duty vehicles, off-road equipment, and federal and international sources. Five measures focus on on-road mobile sources and four measures focus on off-road mobile sources. Lastly, one measure seeks to recognize the criteria pollutant emission reduction benefits of existing incentives programs such as the Carl Moyer Memorial Air Quality Standards Attainment Program and Proposition 1B – Goods Movement Emission Reduction Program. The measures call for greater emission reductions through accelerated turnover of older vehicles to the cleanest vehicles and equipment currently available and increased penetration of commercially-available near-zero and zero-emission technologies through incentives programs in the near-term. In the longer-term, CARB has identified regulatory actions that will lead to additional emission reductions and further greater deployment of zero-emission vehicle technologies everywhere feasible.

Partial-zero and zero-emission technologies are rapidly being introduced into the on-road light- and medium-duty vehicle categories in large part due to the CARB Advanced Clean Car

Program, which includes the Low Emission Vehicle (LEV) and the ZEV Regulations. In addition, next-generation electric hybrid trucks are being commercialized for light-heavy and medium-heavy heavy-duty on-road vehicles. However, additional research and demonstration are needed to commercialize zero- and near-zero emission technologies for the heavier heavy-duty vehicles (with gross vehicle weight [GVW] ratings greater than 26,000 pounds).

For many of the off-road mobile sources such as cargo handling equipment, commercial harbor craft, and off-road equipment, some form of "all zero-emission range" or hybridization is being demonstrated and implementation is expected to begin over the next few years. For other sectors such as locomotives, marine vessels and aircraft, the development of cleaner combustion technologies beyond existing emission standards will be needed. The 2016 AQMP White Papers covering Passenger Transportation, Goods Movement, and Off-Road Equipment provide a general discussion on the need for new emission standards and development of cleaner combustion technologies. In addition, CARB's Technology Assessment documents provide in-depth evaluation of current emissions control technologies and the state of development/commercialization of zero- and near-zero advanced technologies. A summary of the 15 measures is provided in Table 2.8-2.

TABLE 2.8-2

SCAQMD Proposed Mobile Source 8-Hour Ozone Control Measures

Number	Title	Adoption	Implementation Period	Implementing Agency	Emission Reductions (tons/day) (2023/2031)
Emission Growth Management Measure:					
EGM-01	Emission Reductions from New Development and Redevelopment Projects [All Pollutants]	2017	2018–2031	SCAQMD	TBD [a]
Facility-Based Mobile Source Measures:					
MOB-01	Emission Reductions at Commercial Marine Ports [NOx, SOx, PM]	2017	2018–2031	SCAQMD	TBD [b]
MOB-02	Emission Reductions at Rail Yards and Intermodal Facilities [NOx, PM]	2017	2018–2031	SCAQMD	TBD
MOB-03	Emission Reductions at Warehouse Distribution Centers [All Pollutants]	2018	2019–2031	SCAQMD	TBD
MOB-04	Emission Reductions at Commercial Airports [All Pollutants]	2018	2019–2031	SCAQMD	TBD [b]
On-Road Mobile Source Measures:					
MOB-05	Accelerated Penetration of Partial Zero-Emission and Zero-Emission Vehicles [VOC, NOx, CO]	N/A	Ongoing	CARB, SCAQMD	TBD [a]
MOB-06	Accelerated Retirement of Older Light-Duty and Medium-Duty Vehicles [VOC, NOx, CO]	N/A	Ongoing	CARB, Bureau of Automotive Repair, SCAQMD	TBD [a]

TABLE 2.8-2 (CONCLUDED)

SCAQMD Proposed Mobile Source 8-Hour Ozone Control Measures

Number	Title	Adoption	Implementation Period	Implementing Agency	Emission Reductions (tons/day) (2023/2031)
MOB-07	Accelerated Penetration of Partial Zero-Emission and Zero-Emission Light-Heavy- and Medium-Heavy-Duty Vehicles [NOx, PM]	N/A	Ongoing	CARB, SCAQMD	TBD [a]
Off-Road Mobile Source Measures:					
MOB-08	Accelerated Retirement of Older On-Road Heavy-Duty Vehicles [NOx, PM]	2017 (if needed)	2018–2031	CARB, SCAQMD	TBD [a]
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program [NOx, PM]	2017	2018–2027	CARB, SCAQMD	TBD [a]
MOB-10	Extension of the SOON Provision for Construction/Industrial Equipment [NOx]	N/A	Ongoing	SCAQMD	2.0 / 2.0
MOB-11	Extended Exchange Program [VOC, NOx, CO]	N/A	Ongoing	SCAQMD	2.9 / 1.0 [NOx]
MOB-12	Further Emission Reductions from Passenger Locomotives [NOx, PM]	Ongoing	Beginning 2017–2023	SoCal Regional Rail Authority	TBD [b]
MOB-13	Off-Road Mobile Source Emission Reduction Credit Generation Program [NOx, SOx, PM]	2017	2018–2027	SCAQMD	TBD [a]
Incentive Programs Measure:					
MOB-14	Emission Reductions from Incentive Programs [NOx, PM]	N/A	2016–2024	SCAQMD	11 / 7.8 [NOx]

[a] Emission reductions will be determined after projects are identified and implemented.

[b] Submitted into the SIP as part of Rate-of-Progress reporting or in baseline inventories for future AQMP/SIP Revisions.

Source: 2016 AQMP, Table 4-3.

The following text provides a brief description of the proposed control measures presented in Table 2.8-2.

2.8.2.1 Emission Growth Management Measure

There is one proposed control measure within this category. The measure addresses emission reductions from new or redevelopment projects with significant air emissions pursuant to CEQA. The SCAQMD will encourage developers and local agencies to identify actions that will result in mitigation of new criteria pollutant emissions and potentially further reduce criteria pollutant emissions from affected projects.

EGM-01 – EMISSION REDUCTIONS FROM NEW OR REDEVELOPMENT PROJECTS: Since San Joaquin Valley Air Pollution Control District Rule 9510 has been approved by U.S. EPA to be included in the SIP for the San Joaquin Valley, the SCAQMD must consider Rule 9510 under the "all feasible measures" requirement of state law. As such, the applicability of Rule 9510 in the South Coast Air Basin and Coachella Valley will be evaluated. The proposed measure seeks to capture emission reduction opportunities during the project development phase and opportunities to enable greater deployment of zero and near-zero emission technologies. The SCAQMD will reconvene the working group made up of stakeholders from industry, local governments, and community representatives as part of the rulemaking process. The working group will provide input and comments and help identify actions that potentially result in emission reductions to mitigate any new emissions or further reduce emissions. As part of the public process, the SCAQMD staff will evaluate the need to develop a rule or other enforceable mechanisms to ensure that the emission reductions are real, surplus, quantifiable, and enforceable as defined by U.S. EPA if the emission reductions are proposed to be included in the SIP.

2.8.2.2 Facility-Based Mobile Source Measures

With economic growth projected out to 2040 by SCAG, there may be a potential increase in emissions associated with mobile sources in the goods movement sector even with the deployment of newer, cleaner vehicles and equipment. As such, four facility-based mobile source control measures are proposed. The first measure focuses on commercial marine ports in the Basin. Port-related emission sources include on-road heavy-duty trucks, locomotives, ocean-going vessels, commercial harbor craft, and cargo handling equipment. The Ports of Los Angeles and Long Beach have been implementing the San Pedro Bay Ports Clean Air Action Plan (CAAP) since 2006. Implementation of strategies under the CAAP has led to early emission reductions as state, federal, and international regulations are developed. The Ports are in the process of updating the CAAP to implement long-term sustainable strategies that could potentially result in criteria pollutant and GHG emission reductions, while improving operational efficiencies and reducing dependence on fossil-based fuels. To the extent that criteria pollutant emission reductions associated with such actions can be quantified, a mechanism will be developed that recognizes the actions and credits the associated emission reductions into the SIP.

The second measure focuses on mobile source related vehicles and equipment operating in rail yards and intermodal facilities in the Basin. Such vehicles and equipment include cargo handling equipment, locomotives, on-road heavy-duty trucks, and passenger cars. The third and fourth measures focus on warehouse distribution centers and commercial airports. An approach similar to the marine ports measure will be taken to quantify criteria pollutant emission reductions associated with activities occurring at these facilities.

As part of the public process in implementing the four measures, the SCAQMD staff will be assessing the progress in identifying and quantifying emission reductions that may or anticipate to occur at the various facilities. The SCAQMD staff will report to the SCAQMD Governing

Board on a regular basis on the progress of implementing the four measures. If after one year (from the date of adoption of the Final 2016 AQMP), potential emission reductions are not realized either through voluntary actions or from CARB (since these measures are to help implement CARB's "Further Development" measures), the SCAQMD staff may recommend that the SCAQMD Governing Board consider regulatory approaches or other enforceable mechanisms to achieve the emission reductions from the mobile source sectors associated with the various facilities.

MOB-01 – EMISSION REDUCTIONS AT COMMERCIAL MARINE PORTS: The Ports of Los Angeles and Long Beach have been implementing the CAAP since 2006 and is currently in the process of updating the CAAP. The Ports have been successful for the most part in implementing the CAAP and have exceeded emission reduction goals set in the CAAP. The CAAP update has the potential to assist the region in attaining air quality standards in a timely manner. Many of the actions that have been implemented in the CAAP are voluntary in nature since these reductions are not committed in the SIP. Over time, these actions have been subsumed through regulatory actions by CARB, U.S. EPA, or international entities such as the International Maritime Organization. Regardless, the actions have led to early emission reductions. The Ports are in a unique position to work with their tenants (terminal and railroad operators) to develop strategies to further reduce emissions. This measure seeks to quantify the emission reductions realized from the CAAP and credit the reductions into the SIP to the extent that these actions are real and surplus to the SIP. Emission reductions that occurred through the identified actions as reported by the Ports on an annual basis will be incorporated in the revised baseline emissions as part of the SIP revision process (either as part of the Rate-of-Progress reporting requirements of the CAA or reflected in new baseline emissions inventory for future AQMP/SIP revisions). Since many of these actions are voluntary in nature, any emission reductions credited towards attainment of the federal air quality standards must contain an enforceable commitment that the emission reductions remain real and permanent (as defined by U.S. EPA) if for some reason the emission reductions are not maintained after they are reported into the SIP. As such, the enforceable commitment may be in the form of a regulation by the SCAQMD within its existing legal authority, or by the state or federal government, or other enforceable mechanisms. Regardless, the types of enforceable commitments will be developed through a public process. The proposed measure will replace control measures MOB-03 in the 2007 AQMP and IND-01 in the 2012 AQMP.

MOB-02 – EMISSION REDUCTIONS AT RAIL YARD AND INTERMODAL FACILITIES: The goal of this measure is to assess and identify potential actions to further reduce emissions associated with mobile sources operating in and out of rail and intermodal yards. The SCAQMD staff will convene a stakeholders working group to discuss and identify actions or approaches to further reduce emissions at railyards and intermodal facilities. The identified actions can be voluntary or regulations or other enforceable mechanisms adopted by local, state, or federal governmental agencies. To the extent that these actions are voluntary in nature and are sustained over a long-term basis and the emission reduction levels are maintained, the emission reductions may be credited as surplus reductions (as defined by the U.S. EPA) into the SIP. If emission reductions are to be included in the SIP, enforceable commitments to ensure that the emissions are permanent will need to be made and may be in the form of a regulation adopted by the SCAQMD within its legal authority or by other enforceable mechanisms.

MOB-03 – EMISSION REDUCTIONS AT WAREHOUSE DISTRIBUTION CENTERS: The goal of this measure is to assess and identify potential actions to further reduce emissions associated with emission sources operating in and out of warehouse distribution centers. The SCAQMD is currently working with industry stakeholders on conducting in-use truck trip studies and obtaining emissions information from various warehouse distribution types. This information along with emissions occurring in and around individual warehouse distribution centers will serve as the basis for seeking opportunities to reduce emissions beyond existing requirements. A stakeholder working group will be convened to discuss warehouse emissions related issues and provide input and comments on identifying actions that will result in further emission reductions. To the extent that these actions are voluntary in nature and are sustained over a long-term basis and the emission reduction levels are maintained, the emission reductions may be credited as surplus reductions (as defined by the U.S. EPA) into the SIP. If emission reductions are to be included in the SIP, enforceable commitments to ensure that the emissions are permanent will need to be made and may be in the form of a regulation adopted by the SCAQMD within its legal authority or by other enforceable mechanisms.

MOB-04 – EMISSION REDUCTIONS AT COMMERCIAL AIRPORTS: Due to projected increases in airline passenger transportation and expansion of operations at various commercial airports, potential increases in emissions may result unless the increased emissions are fully mitigated. Several airport authorities are implementing emissions mitigation measures, while other airports have initiated actions that can lead to additional emission reductions. This measure seeks to quantify such actions and identify additional actions that can lead to additional emission reductions to assist in attainment of federal air quality standards and reduce local exposure to air toxic emissions. Quantified emission reductions that are real, surplus, permanent, and enforceable will be reflected in future emissions inventories as part of the Rate-of-Progress reporting requirements or in baseline emission inventories as part of future AQMP/SIP development. In addition, such emission reductions can be used for general conformity purposes. A working group will be convened with affected stakeholders to discuss airport emissions related issues and provide input to identify actions and develop mechanisms to implement this measure. To the extent that the identified actions are voluntary in nature and are sustained over a long-term basis and the emission reduction levels are maintained, the emission reductions may be credited as surplus reductions (as defined by the U.S. EPA) into the SIP. If emission reductions are to be included in the SIP, enforceable commitments to ensure that the emissions are permanent will need to be made and may be in the form of a regulation adopted by the SCAQMD within its legal authority or by other enforceable mechanisms.

2.8.2.3 On-Road Mobile Source Measures

Five on-road mobile source control measures are proposed. The first two measures focus on on-road light- and medium-duty vehicles operating in the Basin. It is estimated that about 12 million registered vehicles will be operating in the Basin. The first measure would implement programs to accelerate the penetration and deployment of partial ZEV and ZEV in the light- and medium-duty vehicles categories. The second control measure would seek to accelerate retirement of older gasoline and diesel powered vehicles up to 8,500 pounds GVWR (gross vehicle weight rating). These vehicles include passenger cars, sports utility vehicles, vans, and light-duty pick-up trucks.

The remaining three measures focus on heavy-duty vehicles. The first of these measures seeks additional emission reductions from the early deployment of partial zero-emission and zero-emission light- and medium-heavy-duty vehicles with GVWs between 8,501 pounds to 26,000 pounds. The second control measure for heavy-duty vehicles seeks additional emission reductions from older, pre-2010 heavy-duty vehicles beyond the emission reductions targeted in CARB's Truck and Bus Regulation. Additional emission reductions beyond the compliance requirements of the Truck and Bus Regulation could be achieved as affected fleets purchase trucks with engines that meet an optional NOx emissions standard to replace their existing heavy-duty vehicles. In addition, fleets or trucks that are not subject to the Truck and Bus Regulation would be targeted through incentives or through regulatory actions that are within the SCAQMD's legal authority such as the SCAQMD Rule 1190 series of clean fleet vehicle rules, to purchase trucks with engines meeting an optional NOx emissions standard. The third measure will seek to accelerate the introduction of zero- and near-zero emission on-road heavy-duty trucks through mobile source emission reduction credits (MSERC) generating programs. SCAQMD Rules 1612 and 1612.1 have been in place since 1995 and 2001, respectively. However, the current versions of the rules need to be updated to reflect heavy-duty vehicle technologies available today and in the near-future.

MOB-05 – ACCELERATED PENETRATION OF PARTIAL ZERO-EMISSION AND ZERO-EMISSION VEHICLES: This measure proposes to continue incentives for the purchase of ZEV and hybrid vehicles with a portion of their operation in an "all-electric range" mode. The State Clean Vehicle Rebate Pilot (CVRP) program is proposed to continue from 2016 to 2030 with proposed funding up to $5,000 per vehicle and for low-income eligible residents, additional funding of up to $1,500 for a total of $6,500 per vehicle. The California state legislature has appropriated $133 million statewide for the CVRP in Fiscal Year 2016-17. The proposed measure seeks to provide funding rebates for at least 15,000 zero-emission or partial-zero emission vehicles per year.

MOB-06 – ACCELERATED RETIREMENT OF OLDER LIGHT-DUTY AND MEDIUM-DUTY VEHICLES: This proposed measure calls for promoting the permanent retirement of older eligible vehicles through financial incentives currently offered through local funding incentive programs and the AB 118 Enhanced Fleet Modernization Program. The proposed measure seeks to retire up to 2,000 older light- and medium-duty vehicles (up to 8,500 pounds GVW) per year. Funding incentives of up to $4,500 per vehicle are available to low- and moderate-income residents for the scrapping of the vehicle, which includes a replacement voucher for a newer cleaner conventional powered vehicle, plug-in hybrid electric or dedicated ZEV. For low- and moderate-income residents living in a disadvantaged community, additional funding of up to $5,000 is available for a fuel efficient conventional powered vehicle, plug-in hybrid electric vehicle or dedicated ZEV. The proposed measure seeks to provide funding assistance for at least 2,000 replacement vehicles per year.

MOB-07 – ACCELERATED PENETRATION OF PARTIAL ZERO-EMISSION AND ZERO-EMISSION LIGHT-HEAVY- AND MEDIUM-HEAVY-DUTY VEHICLES: The objective of the proposed action is to accelerate the introduction of advanced hybrid and zero-emission technologies for Class 4 through 6 heavy-duty vehicles. The state is currently implementing a Hybrid Vehicle Incentives Project (HVIP) program to promote zero-emission and hybrid heavy-duty vehicles and CARB allocated $12 million statewide to the program. The proposed measure seeks to continue the program from 2016 to 2030 to deploy up to 120 zero- and partial-zero emission vehicles per year with up to $50,000 funding assistance per vehicle based on the current allocated funding (funding levels vary depending on technology types). Zero-emission vehicles and hybrid vehicles with a portion of their operation in an "all-electric range" mode would be given the highest priority. In addition, the California state legislature appropriated $150 million from the Greenhouse Gas Reduction Fund to invest in zero and near-zero emission on-road heavy-duty vehicles and off-road equipment.

MOB-08 – ACCELERATED RETIREMENT OF OLDER ON-ROAD HEAVY-DUTY VEHICLES: This proposed measure seeks to replace up to 2,000 heavy-duty vehicles per year with newer or new vehicles that meet one of the optional NOx standards adopted by CARB. The funding assistance will be prorated to offer the most funding for heavy-duty engines meeting the optional NOx exhaust emissions standard of 0.02 g/bhp-hr or cleaner. Funding assistance of up to $25,000 per vehicle is proposed and the level of funding will depend upon the NOx emissions certification level of the replacement vehicle meeting one of the optional NOx emission standards. In addition, the SCAQMD may within its authority, adopt a regulation to require purchase of the cleanest commercially available engine, which may include a provision similar to the Surplus Off-Road Opt-In for NOx (SOON) provision of the Statewide In-Use Off-Road Fleet Vehicle Regulation or developing new or expanding existing clean fleet vehicle rules, will be sought to ensure that additional NOx emission reduction benefits are achieved. Other enforceable mechanisms may be considered providing that such mechanisms can be approved into the SIP.

MOB-09 – ON-ROAD MOBILE SOURCE EMISSION REDUCTION CREDIT GENERATION PROGRAM: This proposed measure seeks to accelerate deployment of near-zero and zero-emission on-road heavy-duty trucks through the generation of mobile source emission reduction credits (MSERCs) that can be used for purposes of recognizing mobile source emission reductions at facilities affected by proposed AQMP measures MOB-01 through MOB-04, MOB-08, and EGM-01. The SCAQMD staff will develop amendments to SCAQMD Rules 1612 and 1612.1 to reflect the latest advanced near-zero and zero-emission technologies and revise the quantification methodologies in Rules 1612 and 1612.1. MSERCs generated will be discounted to provide additional benefits to the environment and to help meet air quality standards.

2.8.2.4 Off-Road Mobile Source Measures

Four control measures are proposed to seek further emission reductions from off-road mobile sources and industrial equipment. The first measure calls for the continuation of the SOON provision of the Statewide In-Use Off-Road Diesel Fleet Regulation beyond 2023. The SOON provision implemented to-date has realized additional NOx reductions beyond the Statewide regulation. The second measure seeks to continue the successful lawnmower and leaf blower exchange programs and expand the programs to include a greater variety of zero-emission equipment into the commercial lawn and garden maintenance activities. A significant portion of the NOx emissions from lawn and garden equipment are attributed to larger lawn and garden equipment operating on diesel fuel. The extended exchange program will focus on replacing this equipment with newer equipment. The third measure calls for additional emission reductions from passenger locomotives. The Southern California Regional Rail Authority

(SCRRA or Metrolink), the region's commuter rail service, is in the process of procuring 40 Tier 4 passenger locomotives. This measure will recognize these efforts and continue the purchase of Tier 4 cleaner locomotives. The fourth measure seeks to accelerate the introduction of zero- and near-zero emission off-road equipment through MSERC generating programs. SCAQMD Rule 1620 has been in place since 1995. However, the current version of the rule needs to be revised to reflect current off-road equipment technologies available today and the near-future.

MOB-10 – EXTENSION OF THE SOON PROVISION FOR CONSTRUCTION/INDUSTRIAL EQUIPMENT: To promote turnover (i.e., retire, replace, retrofit, or repower) of older in-use construction and industrial diesel engines, this proposed measure seeks to continue the SOON provision of the Statewide In-Use Off-Road Fleet Vehicle Regulation beyond 2023 through the 2031 timeframe. Historically, the SCAQMD Governing Board has allocated up to $30 million per year for the program. However, more recently, the Governing Board has allocated up to $10 million per year. This measure proposes to extend the current SOON Program beyond 2023 to 2031 with a minimum allocation of $10 million and potentially higher levels upon the Governing Board's approval. In order to implement the SOON program in this timeframe, funding of up to $30 million per year would be sought to help fund the repower or replacement of older Tier 0 and Tier 1 equipment to Tier 4 or cleaner equipment, with approximately 2 tons per day of NOx reductions.

MOB-11 – EXTENDED EXCHANGE PROGRAM: This measure seeks to continue the successful lawnmower and leaf blower exchange programs in order to increase the penetration of electric equipment or new low emission gasoline-powered equipment used in the region. The lawnmower exchange program has resulted in over 55,000 gasoline lawnmowers replaced with zero-emission lawnmowers and over 12,000 older, dirtier gasoline-powered commercial leaf blowers replaced with newer, and cleaner leaf blowers. The SCAQMD is currently conducting a lawn and garden equipment loan program with various public entities to demonstrate the feasibility of zero-emission lawn and garden equipment in various public and commercial settings. Such demonstrations will provide valuable information to lawn and garden equipment manufacturers to produce zero-emission products for the commercial environment. A segment of the lawn and garden equipment population comprised of diesel powered equipment represents a significant fraction of the total NOx emissions associated with this category. As such, the proposed extended exchange program will focus on incentives to accelerate the replacement of older equipment with new Tier 4 or cleaner equipment or zero-emission equipment where applicable. In addition, other small off-road equipment (SORE) equipment may also be considered for exchange programs for accelerating the turnover of existing engines.

MOB-12 – FURTHER EMISSION REDUCTIONS FROM PASSENGER LOCOMOTIVES: This measure recognizes recent actions by the SCRRA to replace their existing passenger locomotives with Tier 4 locomotives. The SCRRA is in the process of procuring 40 Tier 4 passenger locomotives to replace their older existing Tier 0 and Tier 2 passenger locomotives by 2020. The SCRRA Board has indicated a desire to work with the SCAQMD and other stakeholders to evaluate technologies that will further reduce NOx emissions beyond Tier 4 emissions level.

MOB-13 – OFF-ROAD MOBILE SOURCE EMISSION REDUCTION CREDIT GENERATION PROGRAM: This measure seeks to accelerate the early deployment of near-zero and zero-emission off-road equipment through the generation of MSERCs that can be used for purposes of recognizing mobile source emission reductions at facilities affected by proposed AQMP measures MOB-01 through MOB-04 and EGM-01. The SCAQMD staff will develop amendments to SCAQMD Rule 1620 to reflect the latest advanced near-zero and zero-emission technologies and revise the quantification methodologies in Rule 1620. In addition to Rule 1620, the SCAQMD staff has been working on two additional off-road MSERC generation rules to incentivize the early deployment of the cleanest ocean-going vessels that are not subject to the State Vessels At-Berth Regulation or vessel calls that are considered surplus to the Statewide regulation and locomotives that have lower NOx emissions than the current Tier 4 locomotive engine standards. The two rules will be further developed under this measure. MSERCs generated may be discounted to provide additional benefits to the environment and to help meet air quality standards.

2.8.2.5 Incentive Programs Measure

A measure is proposed to recognize the emission benefits resulting from incentive funding programs such as the Carl Moyer Memorial Air Quality Standards Attainment Program and Proposition 1B. The San Joaquin Valley Air Pollution Control District adopted Rule 9610 to recognize the emission reduction benefits of incentive programs in their region. A similar action is proposed under the current measure. The proposed measure describes the six general elements identified by U.S. EPA that will be needed in order for such benefits to be accounted in the SIP.

MOB-14 – EMISSION REDUCTIONS FROM INCENTIVE PROGRAMS: This measure seeks to develop a rule similar to the San Joaquin Valley Air Pollution Control District Rule 9610 to recognize emission reduction benefits associated with incentive programs. The proposed rule would recognize the emission benefits resulting from incentive funding programs such as the Carl Moyer Memorial Air Quality Standards Attainment Program and Proposition 1B such that the emission reductions can be accounted for in the SIP. As previously mentioned, the U.S. EPA indicated that there are six general elements that need to be incorporated in a proposed rule in order for the reductions to be credited in the SIP. The six general elements are the minimal amount of information, documentation, or commitment needed for U.S. EPA to consider approval of emission reduction benefits associated with incentives programs. Additional elements may be identified during the implementation of this measure.

2.8.3 SCAQMD PROPOSED PM2.5 STRATEGY

Despite the attainment demonstration in the 2012 AQMP, the Basin did not meet the 24-hour PM2.5 standard by 2015, mainly due to the drought conditions that persisted for the past several years. The preliminary 2015 data showed that the 24-hour PM2.5 design value was greater than the federal standard of 35 µg/m3. U.S. EPA re-designated the Basin from a "moderate" nonattainment to a "serious" nonattainment area, effective February 12, 2016, which set 2019 as the new attainment deadline. The 2016 AQMP demonstrates that the 24-hour standard will be met by 2019 with no additional reductions beyond already adopted and implemented measures (2016 AQMP, Chapter 5).

For the annual PM2.5 standard (12 µg/m3), the attainment target year is 2021 for a "moderate" nonattainment area and 2025 for a "serious" nonattainment are. Modeling projections show that the annual standard will not be met by 2021 if emission reductions beyond the already adopted control measures are not introduced. The aggressive NOx and VOC reductions proposed to meet the 1997 8-hour ozone standard also do not ensure attainment of the annual PM2.5 standard by 2021. An analysis of the feasibility of additional measures focused on direct PM2.5 and its other precursors did not identify a practical path towards annual PM2.5 attainment by 2021. Therefore, the SCAQMD is requesting a reclassification of the Basin as a "serious" nonattainment area with a new attainment deadline as "expeditiously as practicable," but no later than 2025. While CAA Section 182(e)(5) measures cannot be relied on to show future attainment of PM standards, the NOx strategy to meet ozone standards will still ensure achieving the annual standard by 2025.

However, to further ensure attainment of the annual PM2.5 standards, a series of control measures specifically addressing PM2.5 are being proposed. Table 2.8-3 provides an example of the type of proposed PM2.5 BCM and typical corresponding control methods.

TABLE 2.8-3

SCAQMD Proposed PM2.5 Control Measure Methods

Source Category	Control Method
BCM for PM2.5 and Ammonia Sources	• Add-On Controls • Best Management Practices • Best Available Control Technology • Best Available Retrofit Control Technology • Process Improvement • Targeted Controls • Preventative Measures • Seasonal or Episodic Controls • Market Incentives • Mandatory Curtailments

Source: 2016 AQMP, Table 4-5.

Table 2.8-4 provides a list of the proposed SCAQMD stationary source PM2.5 control measures along with the anticipated adoption/implementation period, implementing agency, and projected emission reductions. The measures cover a variety of source types for PM sources.

TABLE 2.8-4

SCAQMD Proposed Stationary Source PM2.5 Control Measures

Number	Title	Adoption	Implementation Period	Implementing Agency	Emission Reductions (tons/day) (2021/2025)
BCM-01[3]	Further Emission Reductions from Commercial Cooking [PM]	2018	2023–2025	SCAQMD	~~3.3~~0/3.3*
BCM-02	Emission Reductions from Cooling Towers [PM]	2018	2022 & beyond	SCAQMD	TBD [a]
BCM-03	Further Emission Reductions from Paved Road Dust Sources [PM]	TBD	TBD	SCAQMD	TBD [a]
BCM-04[4]	Emission Reductions from Manure Management Strategies [NH3]	TBD	TBD	SCAQMD	TBD [a]
BCM-05	Ammonia Emission Reductions from NOx Controls [NH3]	TBD	TBD	SCAQMD	TBD [a]
BCM-06	Emission Reductions from Abrasive Blasting Operations [PM]	TBD	TBD	SCAQMD	TBD [a]
BCM-07	Emission Reductions from Stone Grinding, Cutting and Polishing Operations [PM]	TBD	TBD	SCAQMD	TBD [a]

[3] Formerly BCM-03 in the 2012 AQMP and BCM-05 in the 2007 AQMP.
[4] Formerly BCM-04 in the 2012 AQMP.

TABLE 2.8-4 (CONCLUDED)

SCAQMD Proposed Stationary Source PM2.5 Control Measures

Number	Title	Adoption	Implementation Period	Implementing Agency	Emission Reductions (tons/day) (2021/2025)
BCM-08	Further Emission Reductions from Agricultural, Prescribed and Training Burning [PM]	TBD	TBD	SCAQMD	TBD [a]
BCM-09	Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves [PM]	TBD	TBD	SCAQMD	TBD [a]
BCM-10	Emission Reductions from Greenwaste Composting [VOC, NH3]	TBD	TBD	SCAQMD	0.1 / 0.1 [NH3]

[*] Will be a contingency measure in the 2016 AQMP.

[a] TBD are reductions to be determined once the technical assessment is complete, and inventory and cost-effective control approach are identified.

Source: 2016 AQMP, Table 4-6.

The following text provides a brief description of the proposed control measures presented in Table 2.8.-4

BCM-01 – FURTHER EMISSION REDUCTIONS FROM COMMERCIAL COOKING: Commercial cooking activities are the largest source of directly emitted PM2.5 emissions in the Basin, and under-fired charbroilers are responsible for the majority of emissions from this source category. To date, a variety of control device technologies have been tested by CE-CERT at the University of California, Riverside, and SCAQMD staff and the inter-agency working group are reviewing draft test results. This control measure is a contingency control measure which would seek additional emission reductions if the annual average PM2.5 standard is not met by 2025. If necessary, the control program would seek to establish a tiered program targeting higher efficiency controls for under-fired charbroilers at large volume restaurants, with more affordable lower efficiency controls at smaller restaurants. As with existing Rule 1138 requirements, a potential future control program for under-fired charbroilers could establish control device efficiency requirements based on restaurant throughput. Efforts could also be taken to develop a control device registration program as an alternative to the SCAQMD permit process. Small business incentive programs funded by mitigation fees or other sources could also be explored to help offset initial purchase and installation costs for restaurants.

BCM-02 – EMISSION REDUCTIONS FROM COOLING TOWERS: This control measure seeks reductions of PM emissions from industrial cooling towers through the use of the latest drift eliminator technologies. This control measure will seek to phase-in the use of drift eliminators with 0.001 percent drift rate for existing cooling towers. This could be achieved by retrofitting older cooling towers with modification to the cooling fans to accompany the drift eliminators, which will also result in water conservation. Newly constructed cooling towers have demonstrated ultra-low drift rates down to 0.0005 percent. This drift rate has been achieved in practice and could be considered a BACT for new construction.

BCM-03 – FURTHER EMISSION REDUCTIONS FROM PAVED ROAD DUST SOURCES: Although fugitive dust emissions from agriculture and construction are primarily in the coarse size fraction (PM10-2.5), entrained road dust is still one of the major direct PM2.5 sources due to the large number of roadways and high traffic volumes in the region. Existing SCAQMD Rules 1157 and 403 requirements to reduce track out from stationary sources are based on a list of options. Further emission reductions could be achieved by specifying the most effective track out prevention measures, such as use of a wheel washing system, for sites with high vehicular activity exiting the site, or those with repeated track-out violations. Existing SCAQMD Rule 1186 requires that certified equipment be used on public roads currently subject to routine street sweeping but does not specify frequency. Further paved road dust PM2.5 emission reductions could be sought through specifying the frequency of street sweeping. Street sweeping is a portion of some local jurisdiction's National Pollutant Discharge Elimination System (NPDES) permits to reduce debris from entering the storm drain system. A review of existing NPDES mandates would be conducted in conjunction with any potential future rulemaking efforts. As part of efforts to reduce paved road dust silt loadings and the corresponding PM emissions, an evaluation of existing SCAQMD fugitive dust rules will be conducted to determine if additional PM2.5 emissions can be achieved.

BCM-04 – EMISSION REDUCTIONS FROM MANURE MANAGEMENT STRATEGIES: This control measure seeks to use manure management systems to reduce ammonia, a PM precursor, from fresh manure. Examples include acidifier application, dietary manipulation, feed additives, and other manure control strategies which can be applied on a year-around basis. To minimize costs, some control technologies can be seasonally or episodically applied during times when high ambient PM2.5 levels are of concern. Dietary manipulation such as lowering the protein content and including high-fiber ingredients is an effective method to decrease ammonia emission from monogastric animals' and ruminants' manure. Feed additives can be considered as a seasonal or episodic control strategy when ambient PM2.5 concentrations are highest. New approaches to reduce ammonia emissions from manure can be considered that include manure slurry injection, microbial manure additives, manure belt cleaning in laying hen houses, cage-free egg laying manure removal, and poultry manure thermal gasification.

BCM-05 – AMMONIA EMISSION REDUCTIONS FROM NOx CONTROLS: This control measure seeks to reduce ammonia from NOx controls such as Selective Catalytic Reduction (SCR) and Selective Non-Catalytic Reduction. These systems are capable of reducing NOx emissions from combustion sources very effectively. However, the use of systems also results in potential emissions of ammonia that "slip" past the control equipment and into the atmosphere. Ammonia is a precursor gas for secondary PM formation. Recent advances in catalyst technology have resulted in the development of ammonia slip catalysts that selectively convert ammonia into nitrogen gas. These catalysts could be installed post-SCR and would result in less ammonia slip.

BCM-06 – EMISSION REDUCTIONS FROM ABRASIVE BLASTING OPERATIONS: Existing SCAQMD Rule 1140 regulates opacity requirements for confined and unconfined abrasive blasting operations using various abrasives. The California Health and Safety Code prohibits local districts from requiring emission and performance standards more or less stringent than the State regulation. Rule 1140 has been developed with the ultimate goal of consistency. Rule 1140 establishes the emission and performance standards, including prohibition against visible emissions from confined or unconfined abrasive blasting operations, which is conforming to the California Code of Regulations Title 17, Subchapter 6 – Abrasive Blasting. Current permit conditions for abrasive blasting require venting to a PM air pollution control equipment when in full use. Baghouses or dry filters are the most frequently used air pollution control equipment. This control measure proposes voluntary applications of a portable blasting enclosure/booth with a dust collection system by providing incentives, primarily focusing on dry abrasive blasting operations conducted in open areas using portable blasting equipment with or without a written SCAQMD permit.

BCM-07 – EMISSION REDUCTIONS FROM STONE GRINDING, CUTTING AND POLISHING OPERATIONS: Stone fabricating operations, including, but not limited to, grinding, cutting, and polishing generate airborne dust emissions containing PM10, some PM2.5, and silica particles that are known to cause lung diseases. Many of these operations are done at confined or unconfined worksites by construction workers, remodeling contractors and individuals, and may not be sufficiently controlled for dust emissions. This control measure seeks both wet and dry methods of control, local exhaust emissions control, no visible emissions requirements, and financial incentives as a regulatory alternative for exchanging existing wet or dry equipment with new equipment that includes integrated add-on controls.

BCM-08 – FURTHER EMISSION REDUCTIONS FROM AGRICULTURAL, PRESCRIBED AND TRAINING BURNING: This control measure proposes to further reduce PM emissions from open burning sources. Further PM emission reductions could be achieved through use of a fee schedule and/or an incentive program to limit agricultural burning and promote burning alternatives (e.g., chipping/grinding or composting). One approach to reduce emissions could involve establishing an administrative fee as part of the burn permit program based on acreage or amount of material burned for the purposes of processing and enforcing. Fees would not be charged to producers using burning alternatives. Another approach could involve providing incentives to agricultural producers, especially in peak PM2.5 areas, to implement alternatives to burning. A demonstration project could also be established where a SCAQMD contractor could conduct chipping/grinding and removal activities in peak PM2.5 areas at no, or reduced, cost to producers.

BCM-09 – FURTHER EMISSION REDUCTIONS FROM WOOD-BURNING FIREPLACES AND WOOD STOVES: This control measure seeks additional emission reductions from residential wood burning activities. Residential wood burning results in directly emitted PM2.5 and curtailment programs and emission reductions can be very cost-effective relative to other source categories. Based on a review of U.S. EPA guidance documents and other air district wood smoke control programs, the existing SCAQMD curtailment program (Rule 445) threshold could be lowered. A lower curtailment criteria (e.g., 20 or 25 μg/m3) could be established, which would increase the number of no burn days but not completely prohibit wood burning during the winter. Based on historical data (2013–2015) for the November through February winter season, it is estimated there would be 11 and 28 additional curtailment days, on average, at the 25 and 20 μg/m3 thresholds, respectively, above the estimate of 24 days at the current threshold. The Check Before You Burn program could also be extended to include the months of October and/or March as high PM2.5 levels can occur during these periods. All of these potential control options would increase the number of no burn days which could lower the contribution of wood smoke to ambient PM2.5 levels in the winter months. Although these episodic reductions are designed to address 24-hour PM2.5 concentrations, a consistent reduction in wintertime PM2.5 from reduced wood burning could have an impact on annual average PM2.5 concentrations. Further analysis will be conducted to determine the appropriate approach to achieve the emission reductions necessary to demonstrate attainment of both the 24-hour and annual average federal PM2.5 standards. The current SCAQMD program encourages households within high PM2.5 areas to upgrade wood-burning devices through SCAQMD incentives of up to $1,600 to offset purchase and installation costs. Although this program has been effective, additional reductions may be achieved through the use of higher incentives or expansion of the eligible geographic area. Experience has shown that education and outreach to targeted households is vital to ensure program participation, and an additional element of this control measure would focus on expanding the awareness of the incentive programs.

BCM-10 – EMISSION REDUCTIONS FROM GREENWASTE COMPOSTING: VOCs and ammonia, which are PM precursor gases, are emitted from composting of organic waste materials including greenwaste and foodwaste and are currently regulated by existing SCAQMD Rule 1133.3. Although Rule 1133.3 covers foodwaste composting, the level of emissions from foodwaste composting has not been fully characterized, mainly due to the lack of related emissions test data. This control measure proposes potential emission minimization through emerging organic waste processing technology and potential emission reductions through restrictions on the direct land application of chipped and ground uncomposted greenwaste and through increased diversion to anaerobic digestion. This proposed control measure could seek a 15-day pathogen reduction process of chipped and ground uncomposted greenwaste with composting BMPs to reduce potential VOC and ammonia emissions from land applied greenwaste.

2.8.4 SCAQMD AIR TOXIC CONTROL MEASURES

In addition to the criteria pollutant control measures, the SCAQMD is proposing additional measures to control toxic air contaminants (TACs) from stationary sources in the SCAQMD. To the extent feasible, the 2016 AQMP is capturing co-benefit opportunities in achieving multi-pollutant reductions to meet ambient air quality standards having multiple deadlines. For example, some criteria pollutant control measures will concurrently reduce air toxics and some air toxics control measures will reduce criteria pollutants. The proposed control measures, their objectives, and expected control approaches are summarized in Table 2.8-5.

TABLE 2.8-5

SCAQMD Proposed Air Toxic Control Measures

Number	Measure	Objective	Potential TAC	Control Approach
TXM-01	Control of Metal Particulate from Metal Grinding Operations	Reduce metal particulate emissions from metal grinding activities at forging facilities, metal foundries, and plating operations	• Cadmium • Hexavalent Chromium • Cobalt • Nickel • Particulate (metal)	• Enclosures • Pollution controls • Housekeeping measures
TXM-02	Control of Toxic Metal Particulate Emissions from Plating and Anodizing Operations	Further reduce fugitive metal particulate emissions from electroplating and chromic acid anodizing processes	• Hexavalent Chromium • Nickel • Cadmium • Copper • Lead • Particulate (metal)	• Enclosures • Pollution controls • Enhanced housekeeping measures • Physical modifications to increase capture efficiency and reduce fugitive emissions
TXM-03	Control of Hexavalent Chrome from Chrome Spraying Operations	Further control hexavalent chromium emissions from spraying of paints and coatings containing hexavalent chromium	• Hexavalent Chromium • Particulate (metal)	• Increased housekeeping and best management practices
TXM-04	Control of Toxic Metal Particulate Emissions from Contaminated Soil	Control toxic metal particulates during soil cleanup/remediation activities.	• Lead • Hexavalent Chromium • Cadmium • Nickel • Arsenic • Possibly Other Metal TACs • Particulate (metal)	• Soil covering • Chemical treatment • Barriers • Wheel knockout and cleaning stations • Other suppression techniques
TXM-05	Control of Toxic Metal Particulate Emissions from Laser Plasma Cutting	Control toxic metal particulates from laser and plasma cutting operations	• Nickel • Cadmium • Hexavalent chromium • Possibly Other Metal TACs)	• Filter technology including HEPA filters • Alternative technologies such as flame and water jet cutting
TXM-06	Control of Toxic Emissions from Metal Melting Facilities	Further reduce metal toxic emissions from melting, pouring, casting, degating, heat treating, surface cleaning, and finishing operations at foundries	• Arsenic • Cadmium • Nickel • Other toxic metals • Particulate (metal)	• Particulate filter technologies for furnaces • Enclosures • Increased housekeeping and best management practices • Possibly ambient air monitoring

TABLE 2.8-5 (CONCLUDED)

SCAQMD Proposed Air Toxic Control Measures

Number	Measure	Objective	Potential TAC	Control Approach
TXM-07	Control of Lead Emissions from Stationary Sources	Further control of lead emissions from non-vehicular sources	• Lead • Particulate (metal)	• Reduce ambient lead concentration • Increased housekeeping and best management practices
TXM-08	Control of Emissions from Chemical Stripping of Cured Coatings	Reduce methylene chloride emissions from furniture chemical stripping operations	• Methylene Chloride	• Reformulation • Activated carbon
TXM-09	Control of Emissions from Oil and Gas Well Activities	Reduce toxic emissions during well drilling, maintenance, and stimulation activities at oil and gas production sites	• Benzene • Toluene • Ethylbenzene • Xylene • Diesel particulate matter • Particulate Matter	• Pollution control and best management practices to minimize emissions from portable storage tanks, circulation tanks, and portable totes with particulates • Use of the cleanest diesel equipment available for off-road engines • Housekeeping provision

TXM means toxic air contaminant control measure.

The following text provides a brief description of the proposed control measures presented in Table 2.8-5.

TXM-01 - METAL GRINDING OPERATIONS: The objective of this control measure is to control fugitive toxic metal particulate emissions at forging facilities, metal foundries, and plating operations. In general, there are no current SCAQMD regulatory requirements for metal grinding operations, and this activity is exempt from permitting. Metal grinding is a material removal and surface preparation process used to shape and finish metal parts. Grinding employs an abrasive product, usually a rotating wheel brought into controlled contact with the metal surface that removes tiny pieces of metal from the part generating metallic chips and dust. This activity is common in both heavy and light industrial processes such as metal foundries and forging and plating operations that commonly produce parts for the aerospace, automotive, and oil and gas industries. Potential metal particulate emission control approaches include conducting grinding within permanent enclosures, capture and control through add-on controls, and housekeeping measures. Examples of add-on controls include, cyclones, baghouses, scrubbers and high efficiency particulate arrestors (HEPA) filters. Effective housekeeping measures may include routine wet washing or vacuuming, proper material storage and disposal, and routine maintenance of emission control devices. This measure will be implemented as individual source-specific rules are adopted or amended.

TXM-02 – PLATING AND ANODIZING OPERATIONS: The purpose of this control measure is to further control metal (hexavalent chrome, nickel, cadmium, copper, arsenic and lead) emissions from plating and anodizing operations. Hexavalent chromium electroplating and chromic acid anodizing are processes currently regulated under SCAQMD Rule 1469 – Hexavalent Chromium Emissions from Chromium Electroplating and Chromic Acid and

Anodizing Operations. Other non-hexavalent chromium plating operations are regulated under SCAQMD Rule 1426 – Emissions from Metal Finishing Operations. Electroplating processes involve the creation of desired metal surfaces or substrates. Both nickel and copper plating are commonly performed prior to chrome plating in order to provide a substrate for the chrome to adhere to or to add additional properties such as strength. In many cases, nickel plating is performed as the only or final stage of plating where appearance is the primary desired quality of the end product. Other sources of fugitives can come from air sparging, openings or cross-draft conditions within buildings or enclosures, poor housekeeping, improper handling of waste, and improper handling of raw products. Hexavalent chromium electroplating and chromic acid anodizing processes are used in various industries including aerospace, automotive, computer electronics, machinery, and industrial equipment, and defense government. Current point source control approaches include chemical or mechanical methods to control surface tension of the baths in the tank, or capture of emissions using add-on air pollution controls such as scrubbers, mesh pads, and HEPA filters. Fume suppressants are extremely effective at minimizing process fugitive emissions from the tank, especially in situations where facilities have cross draft conditions in buildings where tanks are located, or conduct operations around tanks that may affect the release or behavior of the emissions. When used in combination with add-on air pollution control equipment, fume suppressants serve as the primary control of both point source and fugitive emissions prior to collection by the control device, and optimizes the overall emission reduction potential of the system. Facilities also can utilize best housekeeping and best management practices to mitigate fugitive emissions. In some cases, facilities may use alternative materials or plating processes. Additionally, alternative methods of applying a metal coating may be used such as aluminum ion vapor deposition, physical vapor deposition, or metal spray coating. This measure would be implemented through amendments to SCAQMD Rules 1426 and 1469.

TXM-03 – CHROME SPRAYING OPERATIONS: The objective of this control measure is to further control hexavalent chromium emissions from spraying of paints and coatings. Spraying of paints and coatings containing chromium or hexavalent chromium is currently regulated under SCAQMD Rule 1469.1 - Spraying Operations Using Coatings Containing Chromium. During the uncontrolled application of coatings, hexavalent chromium emissions are generated by the inefficient transfer of paint to the part or from overspray. Spraying operations are typically conducted within a paint spray booth and emissions are exhausted through a wall of filter media or stack, assuming a properly designed booth and ventilation system. However, there is also a potential for fugitive emissions to occur from an open booth face, if capture into the ventilation system is not complete. Additionally, fugitive hexavalent chromium emissions can be generated by poor housekeeping, improper use of control equipment, and improper handling of waste or painted products. SCAQMD Rule 1469.1 currently includes requirements for spray enclosures, transfer efficiency, and housekeeping practices within spray enclosures. Paints and coatings containing hexavalent chromium occur in a variety of industries including aerospace, electroplating, and coating facilities. Current housekeeping requirements of SCAQMD Rule 1469.1 include general measures and best management practices for the clean-up, handling, storage, and disposal of waste generated within spray booth enclosures. The existing provisions for enclosures can be enhanced by requiring routine and periodic housekeeping inspections, in addition to new housekeeping and work practice requirements outside of spray enclosures in order to comprehensively reduce fugitive emissions from the facility. This measure would be implemented through amendments to SCAQMD Rule 1469.1.

TXM-04 – TOXIC AIR CONTAMINANT EMISSIONS FROM DECONTAMINATION OF SOIL: Currently the SCAQMD has a rule regulating VOC emissions from contaminated soil that establishes requirements to ensure the release of VOC emissions are minimized. There is currently no rule to address metal particulate emissions that can become airborne during the handling and disturbance of soils contaminated with toxic metals. Examples of metal toxic air contaminants that can be in contaminated soil include, but are not limited to, hexavalent chromium, lead, nickel, cadmium, and arsenic. This control strategy would establish specific requirements to ensure that fugitive toxic air contaminant emissions from soils contaminated with toxic metals are minimized during the excavation, storage, and/or transportation. This control strategy would include soil covering, watering, chemical treatment, barriers, tire and wheel knockout and cleaning stations, and other dust suppression techniques. Air monitoring of the site may also be a part of the control strategy. This measure would be implemented as a new SCAQMD Rule.

TXM-05 – LASER AND PLASMA CUTTING: The control measure would control metal particulate emissions from laser and plasma cutting operations. Laser and plasma cutting technologies are used for cutting and fabricating large sheets of metal goods. Laser cutting directs a laser onto most metals (except reflective metals including aluminum, brass and copper) which melts or vaporizes the metal. Plasma cutting uses electrically conductive gas to transfer energy from an electrical power source through the plasma to the metal being cut. The high temperature of the plasma melts the metal. The intense energy of both the laser and plasma cutting process creates fumes and smoke from vaporizing the molten material from the bottom of the cut (kerf). Uncontrolled vaporized metals such as cadmium and nickel present environmental and health concerns. Additionally, high energy processes, such as laser and plasma cutting, can oxidize the elemental chrome in stainless steel into hexavalent chrome. Control approaches under this measure would include filter technologies such as HEPA filters or possibly other pollution controls. Alternative processes are available including flame cutting, water jet cutting, welding, and conventional machining. This measure would be implemented as a new SCAQMD Rule.

TXM-06 – CONTROL OF TOXIC EMISSIONS FROM METAL MELTING FACILITIES: This control measure seeks to further reduce metal toxic emissions such as arsenic, cadmium, and nickel from foundries and other metal melting facilities (smelting, tinning, galvanizing and other miscellaneous processes where metals are processed in molten form). Other metal melting operations include smelting, tinning, galvanizing, and other miscellaneous processes where metals are processed in molten form. Metal foundries are facilities which produce metal castings. The process involves melting metal into a liquid, pouring the liquid metal into a mold or casting, allowing the metal to cool and solidify, removing the mold or casting, degating, heat treating, surface cleaning, and finishing. Possible emission sources from such operations include, but are not limited to, fume, particulate, or dust from the melting, pouring, casting, degating, heat treating, coating, brazing, finishing, or surface cleaning processes, leftover metal or slag, and housekeeping. Emissions can potentially be reduced through venting operations to an emission collection system or improvements to existing collection systems, such as the addition of high efficiency filters. Fugitive emissions can be reduced through housekeeping measures which may include, but are not limited to, sweeping, mopping or filtered vacuuming and enclosed material storage. Equipment may require new or updated source testing and potentially new or updated permits. Additionally, an ambient air monitoring requirement is under consideration. This measure would be implemented through amendments to SCAQMD Rule 1407 and possibly a new SCAQMD Rule.

TXM-07 – CONTROL OF LEAD EMISSIONS FROM STATIONARY SOURCES: The objective of this control measure is to further control lead emissions from non-vehicular sources. Lead and arsenic emissions from large lead-acid battery recycling facilities are regulated by SCAQMD Rule 1420.1. Emissions of lead from large (>100 ton per year) metal melting facilities are regulated by SCAQMD Rule 1420.2. All other non-vehicular sources of lead are regulated by SCAQMD Rule 1420. Lead is found in metals and aggregate processed either as an alloy or as a contaminant. Facilities process lead in aggregate processing, metal melting, metal finishing, metal machining operations, and also use lead solder for electronic circuit boards. Possible emission sources from such operations include, but are not limited to, fume, particulate, or dust from the mining, melting, finishing, or surface cleaning processes, leftover metal or slag, and poor housekeeping. Control of lead emissions often occurs concurrently with the control of other toxic metals. Emissions can be controlled through improved housekeeping requirements and best management practices similar to those included in SCAQMD Rule 1420.1, including provisions for general cleaning, rooftop cleaning, and handling, storage, and disposal of waste generated to comprehensively reduce fugitive lead emissions. This measure would be implemented through amendments to SCAQMD Rule 1420.

TXM-08 – CHEMICAL STRIPPING OF CURED COATINGS: This proposed control measure would restrict the use of methylene chloride during chemical stripping operations. Methylene chloride is a suspect carcinogen and is classified as a Hazardous Air Pollutant by U.S. EPA and as a TAC by the state of California. A typical chemical stripping product contains between 70 and 85 percent methylene chloride by weight. Methylene chloride is the active ingredient that penetrates the coating film and lifts the coating off the surface. Most chemical stripper usage is done without any equipment or controls. The chemical stripper is applied by brush and then rinsed off afterwards. Larger users of chemical strippers are usually furniture stripping shops which sometimes utilize tanks and flow trays to use the chemical stripper. Other uses include automobile rim coating operations and residential furniture restoration. Reformulation is the preferred method for reducing methylene chloride emissions. The use of control equipment may also be a consideration. This measure would be implemented through a new SCAQMD Rule.

TXM-09 – OIL AND GAS PRODUCTION: Existing oil and gas field production facilities are required to notify the SCAQMD of a planned well maintenance or stimulation event under SCAQMD Rule 1148.2 – Notification and Reporting Requirements for Oil and Gas wells and Chemical Suppliers. In addition to the notification requirements, SCAQMD Rule 1148.2 also requires operators to report chemical usage during each operation, although trade secret chemicals are not revealed to the public. Oil and gas field production well maintenance and stimulation activities release emissions such as diesel particulate matter (DPM), fugitive dust, and other air toxic emissions such as benzene, toluene, ethylbenzene, and xylene (BTEX) compounds. This control measure seeks to develop a series of BMPs to reduce the emission impact from the well maintenance and stimulation activities. The implementation of the BMPs specified may be contingent upon the proximity to sensitive receptors. The BMPs may include: (1) reduction of BTEX compounds from return fluids during gravel packing and hydraulic fracturing events by the use of carbon absorbers to control emissions venting from portable storage tanks, covering circulation tanks, and closing access hatches on portable storage tanks; (2) reduction of BTEX compounds from drilling mud return processing equipment by covering areas open to atmosphere; (3) reduction of fugitive silica dust from the use of portable plastic totes; (4) reduction of DPM from the use of Tier 3 and 4 off-road engines, or engines equipped with a CARB certified Level 3 diesel particulate filter (DPF); and (5) work area plastic ground coverings to collect spills and reduce fugitive dust. The implementation of this control measure would be through an amendment to SCAQMD Rule 1148.2.

2.8.5 STATE AND FEDERAL CONTROL MEASURES

The 2016 AQMP also includes control measures to reduce emissions from sources that are primarily under the state and federal jurisdiction, including on-road and off-road mobile sources. These reductions are needed to achieve the remaining emission reductions necessary for ozone and PM2.5 attainment. CARB released the Proposed 2016 State Strategy for the SIP (State SIP Strategy) on May 17, 2016. The new measures contained in the State SIP Strategy commitment reflect a combination of state actions, petitions for federal action, as well as actions that outline a pathway for achieving further deployment of the cleanest technologies in each sector. The NOx and VOC emission reductions from the proposed new State SIP Strategy measures in 2023 and 2031 are summarized in Table 2.8-6. CARB's proposed state SIP Strategy for on-road vehicles, locomotives, ocean going vessels, and off-road equipment are also briefly summarized in this section.

TABLE 2.8-6

Expected Emission Reductions (tons/day) in the Basin from State SIP Strategy Measures

CM Number	Title	Action	Implementation Begins	2023 Reduction (tons/day)	2031 Reduction (tons/day)
On-Road Light-Duty					
ORLD-01	Advanced Clean Cars 2	2020	2026	-	0.6 (NOx) ~~0.3~~ 0.4 (ROG)
ORLD-02	Lower In-Use Emission Performance Assessment	NA	ongoing	nyq	nyq
ORLD-03	Further Deployment of Cleaner Technology: On-Road Light-Duty Vehicles	Ongoing	2016	7 (NOx) 16 (ROG)	5 (NOx) 16 (ROG)

TABLE 2.8-6 (CONT.)

Expected Emission Reductions (tons/day) in the Basin from State SIP Strategy Measures

CM Number	Title	Action	Implementation Begins	2023 Reduction (tons/day)	2031 Reduction (tons/day)
On-Road Heavy-Duty					
ORHD-01	Lower In-Use Emission Performance Level for Heavy-Duty Vehicles	2016	2017	nyq	nyq
ORHD-02	Low-NOx Engine Standard	2017-2019	CA Implementation: 2023 Federal Implementation: 2024	-	5 (NOx – CA action), 7 (NOx – Federal action)
ORHD-03	Medium and Heavy-Duty GHG Phase 2	2016 – 2019	2018	nyq	nyq
ORHD-04	Advanced Clean Transit	2017	2018	<0.1 (NOx) <0.1 (ROG)	0.1 (NOx) <0.1 (ROG)
ORHD-05	Last Mile Delivery	2018	2020	<0.1 (NOx) <0.1 (ROG)	0.4 (NOx) <0.1 (ROG)
ORHD-06	Innovative Technology Certification Flexibility	2016	2016	nyq	nyq
ORHD-07	Zero Emission Airport Shuttle Buses	2018	2023	nyq	nyq
ORHD-08	Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy-Duty Vehicles	on-going	2016	3 (NOx) 0.4 (ROG)	3 (NOx) 0.4 (ROG)
ORHD-09	Further Deployment of Cleaner Technology: On-Road Heavy Duty Vehicles	ongoing	2016	34 (NOx) 4 (ROG)	11 (NOx) 1 (ROG)

TABLE 2.8-6 (CONCLUDED)

Expected Emission Reductions (tons/day) in the Basin from State SIP Strategy Measures

CM Number	Title	Action	Implementation Begins	2023 Reduction (tons/day)	2031 Reduction (tons/day)
Marine, Rail, and Aircraft Off-Road					
ORFIS-01	More Stringent National Locomotive Emission Standards	2016	2023	0.7 <0.1 (ROG)	8 (NOx) 0.3 ROG
ORFIS-02	Tier 4 Vessel Standards	2015-2018	2025	-	4 (NOx)
ORFIS-03	Incentivize Low Emission Efficient Ship Visits	2017-2018	2018	nyq	nyq
ORFIS-04	At-Berth Regulation Amendments	2017-2018	2022	0.3 (NOx) <0.1 (ROG)	1 (NOx) <0.1 (ROG)
ORFIS-05	Further Deployment of Cleaner Technology: Off-Road Federal and International Sources	ongoing	2016	~~13~~9 (NOx) nyq (ROG)	~~10~~13 (NOx) nyq (ROG)
Other Off-Road					
OFFS-01	Zero Emission Off-Road Forklift Regulation Phase 1	2020	2023	-	1 (NOx) 0.1 (ROG)
OFFS-02	Zero Emission Off-Road Emission Reduction Assessment	2025	-	nyq	nyq
OFFS-03	Zero Emission Off-Road Worksite Emission Reduction Assessment	tbd	-	nyq	nyq
OFFS-04	Zero Emission Airport Ground Support Equipment	2018	2023	<0.1 (NOx) <0.1 (ROG)	<0.1 (NOx) <0.1 (ROG)
OFFS-05	Small Off-Road Engines	2018	2022	0.7 (NOx) 7 (ROG)	2 (NOx) 16 (ROG)
OFFS-06	Transport Refrigeration Units Used for Cold Storage	2017-2018	2020	nyq	nyq
OFFS-07	Low-Emission Diesel Requirement	By 2020	2023	~~0.6~~0.3 (NOx)	~~2~~1 (NOx)
OFFS-08	Further Deployment of Cleaner Technologies: Off-Road Equipment	Ongoing	2016	21 (NOx) 21 (ROG)	~~17~~18 (NOx) 20 (ROG)
Consumer Products					
CPP-01	Consumer Products Program	2019-2021	2020	-	5 (ROG)

nyq means not yet quantified.

The following text provides a brief description of the proposed control measures presented in Table 2.8-6.

2.8.5.1 On-Road Light-Duty Vehicles

ORLD-01 - ADVANCED CLEAN CARS 2: This proposed measure is designed to ensure that zero and near-zero emission technology options continue to be commercially available, with range improvements to address consumer preferences for greater ease of use, and maximize electric vehicle miles travelled. The regulation may include lowering fleet emissions further beyond the super-ultra-low-emission vehicle standard for the entire light-duty fleet through at least the 2030 model year, and look at ways to improve real world emissions through implementation programs. Additionally, new standards would be considered to further increase the sales of ZEVs and plug-in hybrid electric vehicles beyond the levels required in 2025.

ORLD-02 - LOWER IN-USE EMISSION PERFORMANCE ASSESSMENT: This proposed measure is designed to ensure that vehicles continue to operate at their cleanest possible level by evaluating California's in-use performance-focused inspection procedures and, if necessary, make improvements to further the program's effectiveness. Results from the assessment could be used to improve inspection test procedures, address program fraud, improve the effectiveness and durability of emission-related repair work, and to improve the regulations governing the design of in-use performance systems on motor vehicles to the extent necessary.

ORLD-03 - FURTHER DEPLOYMENT OF CLEANER TECHNOLOGY: ON-ROAD LIGHT-DUTY VEHICLES: This proposed measure is designed to achieve further emission reductions for the Basin's attainment needs through a suite of additional actions, including greater penetration of zero and near-zero technologies through incentive programs, and emission benefits associated with increased transportation efficiencies, as well as the potential for autonomous vehicles and advanced transportation systems. The emission reductions will be achieved through a combination of actions to be undertaken by both CARB and the SCAQMD.

2.8.5.2 On-Road Heavy-Duty Vehicles

ORHD-01 - LOWER IN-USE EMISSION PERFORMANCE LEVEL FOR HEAVY-DUTY VEHICLES: This proposed measure is designed to ensure that heavy-duty vehicles continue to operate at the cleanest possible level. CARB would develop new, supplemental actions, in the form of regulatory amendments or new regulations, to address in-use compliance and to decrease engine deterioration. This suite of actions includes: revising the warranty requirements to better reflect the operation of these vehicles; revising the current opacity limit in CARB's existing roadside and fleet inspection programs to better reflect the capability of current technology; revising the not to exceed supplemental test procedures for heavy-duty diesel engines; revising the durability demonstration provisions within the certification requirements; and developing a comprehensive inspection and maintenance program for heavy-duty trucks to test for excessive emissions of multiple pollutants.

ORHD-02 - LOW-NOx ENGINE STANDARD: This proposed measure is designed to require near-zero emission engine technologies that will substantially lower NOx emissions from on-road heavy-duty vehicles. CARB will begin development of a new heavy-duty low-NOx emission standard in California in 2017, with Governing Board action expected in 2019. A California-only low-NOx standard would apply to all vehicles with new heavy-duty engines sold in California starting in 2023. In order to achieve the maximum emission reductions from this proposed measure, CARB may also petition U.S. EPA to establish a new federal heavy-duty engine emission standard. If U.S. EPA fails to initiate the rule development process by 2017, CARB would continue with its development and implementation efforts to establish a California-only low-NOx standard. If U.S. EPA begins the regulatory development process for new federal heavy-duty emission standards by 2017, CARB will coordinate its regulatory development efforts with the federal regulation.

ORHD-03 - MEDIUM AND HEAVY-DUTY GHG PHASE 2: This proposed measure is designed to advance fuel efficiency improvements and achieve greater GHG emission reductions through the introduction of the next generation of integrated engine, powertrain, vehicle and trailer technologies designed to reduce climate emissions and fuel use. U.S. EPA has recently finalized new federal Phase 2 standards for GHG emissions from medium- and heavy-duty vehicles. These new standards will build upon the Phase 1 standards and will push technology improvements beyond what is currently in widespread commercial use. CARB staff plans to present a California Phase 2 proposal for the Governing Board’s consideration in 2017. In addition to harmonizing with the federal Phase 2 standards where applicable, staff’s proposal may include some more stringent, California-only provisions that are necessary to meet California’s unique air quality challenges.

ORHD-04 - ADVANCED CLEAN TRANSIT: This measure is designed to continue the transition of transit fleets to cleaner technologies to support NOx and GHG emission reduction goals. The measure will consider a variety of approaches to enhance the deployment of advanced clean technology and increase the penetration of the first wave of zero-emission heavy-duty technology into transit applications that are well suited to its use. CARB staff will develop and propose an Advanced Clean Transit measure with a combination of incentives, and/or other methods that would result in transit fleets purchasing advanced technology buses during normal replacement and using renewable fuels when contracts are renewed.

ORHD-05 - LAST MILE DELIVERY: This measure is designed to increase the penetration of the first wave of zero-emission heavy-duty technology into applications that are well suited to its use. This proposed measure will require the use of low-NOx engines and the purchase of zero-emission trucks for certain class 3-7 last mile delivery trucks in California starting in 2020, with a low fraction initially and gradually ramping up to a higher percentage of the fleet at time of normal replacement through 2030.

ORHD-06 - INNOVATIVE TECHNOLOGY CERTIFICATION FLEXIBILITY: This proposed measure is designed to encourage early deployment of the next generation of truck and bus technologies through defined, near-term CARB certification and on-board diagnostic compliance flexibility for medium- and heavy-duty vehicles. This regulation is intended to balance the need to provide key, promising technologies with a predictable and practical CARB-certification pathway, while ensuring the expected emission benefits of advanced truck and bus technologies are achieved in-use. This regulation would provide flexibility for potentially transformational engine and vehicle technologies, such as robust hybrids and heavy-duty engines meeting the optional low-NOx standard.

ORHD-07 - ZERO-EMISSION AIRPORT SHUTTLE BUSES: This proposed measure is designed to achieve NOx and GHG emission reductions goals through advanced clean technology, and to increase the penetration of the first wave of zero-emission heavy-duty technology into applications that are well suited to its use. Like transit buses, the inclusion of zero-emission airport shuttles would serve as a stepping stone to encourage broader deployment of zero-emission technologies in the on-road sector. CARB would develop and propose a regulation or other measures to deploy zero-emission airport shuttles in order to further support market development of zero-emission technologies in the heavy-duty sector.

ORHD-08 - INCENTIVE FUNDING TO ACHIEVE FURTHER EMISSION REDUCTIONS FROM ON-ROAD HEAVY-DUTY VEHICLES: This proposed measure would use existing CARB and SCAQMD incentive and other innovative funding programs for on-road, heavy-duty vehicles to increase the penetration of zero and near-zero vehicles. Funding mechanisms would target technologies that meet CARB's current optional low-NOx standard through 2023, consistent with the current round of Moyer funding.

ORHD-09 - FURTHER DEPLOYMENT OF CLEANER TECHNOLOGY: ON-ROAD HEAVY-DUTY VEHICLES: This proposed measure is designed to achieve further emission reductions for the Basin's attainment needs through a suite of additional actions, including greater penetration of zero and near-zero technologies through incentive programs, emission benefits associated with increased operational efficiency strategies, and the potential for new driver assist and intelligent transportation systems. The emission reductions will be achieved through a combination of actions to be undertaken by both CARB and the SCAQMD.

2.8.5.3 Locomotives

ORFIS-01 - MORE STRINGENT NATIONAL LOCOMOTIVE EMISSION STANDARDS: This proposed measure is designed to reduce emissions from new and remanufactured locomotives. CARB would petition U.S. EPA for both new Tier 5 national locomotive emission standards for new locomotives, and for more stringent national requirements for remanufactured locomotives. CARB staff estimates that the U.S. EPA could require manufacturers to implement the new locomotive emission regulations as early as 2023 for remanufactured locomotives, and 2025 for newly manufactured locomotives. A new federal standard could also facilitate development and deployment of zero-emission track mile locomotives and zero-emission locomotives by building incentives for those technologies into the regulatory structure.

2.8.5.4 Ocean Going Vessels

ORFIS-02 - TIER 4 VESSEL STANDARDS: This measure is designed to reduce emissions from ocean going vessels. CARB would advocate with U.S. EPA, the U.S. Coast Guard, and international partners for the International Maritime Organization to adopt more stringent emission standards. Specifically, CARB would advocate for new Tier 4 NOx and PM standards, plus efficiency targets for existing vessels, and new vessel categories not covered by International Marine Organization efficiency standards.

ORFIS-03 - INCENTIVIZE LOW EMISSION EFFICIENT SHIP VISITS: This measure is designed to achieve early implementation of clean vessel technologies (e.g., liquefied natural gas, Tier 3 standards or better), and to incentivize vessels with those technologies in California service. CARB staff would work with California seaports, ocean carriers, and other stakeholders to develop the criteria and to identify the best way to incentivize introduction of Low Emission Efficient Ships into the existing fleet of vessels that visit California seaports.

ORFIS-04 - AT-BERTH REGULATION AMENDMENTS: This measure is designed to further reduce emissions from ships auxiliary engines at-berth. CARB would investigate expanding the current At-Berth Regulation to include smaller fleets and/or additional vessel types (including roll-on/roll-off vehicle carriers, bulk cargo carriers, and tankers).

ORFIS-05 - FURTHER DEPLOYMENT OF CLEANER TECHNOLOGIES: OFF-ROAD FEDERAL AND INTERNATIONAL SOURCES: This measure is designed to achieve further emission reductions for the Basin's attainment needs. This proposed measure outlines a series of actions that would be taken at the state and local level to achieve further reductions among the three categories off-road federal and international sources: ocean-going vessels, aircraft, and locomotives. These actions include: expanding and enhancing incentive programs to increase the deployment of cleaner technologies; incentivizing cleaner ships and aircraft to come to California; partnering with engine manufacturers to encourage production of cleaner, more efficient engines; continuing to support demonstration projects; and encouraging efficiency improvements. Achieving the magnitude of emission reductions necessary from this category will require strong action at the federal and international level, coupled with state and local advocacy and action to facilitate these efforts.

2.8.5.5 Off-Road Equipment

OFFS-01 - ZERO-EMISSION OFF-ROAD FORKLIFT REGULATION PHASE 1: This measure is designed to increase penetration of ZEVs in off-road applications, advance ZEV commercialization, and to set a market signal to technology manufacturers and investors. CARB staff would develop and propose a regulation with specific focus on forklifts with lift capacities equal to or less than 8,000 pounds for which zero-emission technologies have already gained appreciable customer acceptance and market penetration.

OFFS-02 - ZERO-EMISSION OFF-ROAD EMISSION REDUCTION ASSESSMENT: This measure is designed to transfer zero and near-zero emission technologies in non-freight, off-road applications to heavier equipment, such as high lift-capacity forklifts or other equipment in the construction, industrial, and mining sectors. Through this assessment, CARB would provide the Governing Board with an informational update regarding the status of ZEVs in off-road applications once the Phase 1 forklift regulation is in place in 2025 or later, which would focus primarily on the scalability and transferability of zero-emission technologies to larger, higher power-demand equipment types, and would be used to inform the development of the Phase 2 regulation.

OFFS-03 - ZERO-EMISSION OFF-ROAD WORKSITE EMISSION REDUCTION ASSESSMENT: This measure is designed to foster the development of a robust worksite efficiency program and to facilitate the deployment of technologies and/or strategies that increase worksite efficiency, such as connected vehicles, automation, and fleet management technologies in off-road sectors. Through this assessment, CARB would identify opportunities to further expand the use of the aforementioned strategies and/or zero and near-zero emission technologies, and would provide the Governing Board with an informational update regarding the status of the aforementioned technologies and/or strategies, with a focus on business return on investment, scalability and sustainability of the system. CARB would also encourage deployment via incentives or by providing credit in the off-road rule.

OFFS-04 - ZERO-EMISSION AIRPORT GROUND SUPPORT EQUIPMENT: This measure is designed to increase the penetration of the first wave of zero-emission heavy-duty technology in applications that are well suited to its use, and to facilitate further technology development and infrastructure expansion. CARB would develop and propose a regulation to accelerate the transition of diesel and large spark ignition airport ground support equipment to zero-emission technology.

OFFS-05 - SMALL OFF-ROAD ENGINES: This measure is designed to reduce emissions from SORE, and to increase the penetration of zero-emission technology. SORE that are subject to CARB regulations are used in residential and commercial lawn and garden equipment, and other utility applications. CARB will develop and propose tighter exhaust and evaporative emission standards, encourage increased use of zero-emission equipment, and enhance enforcement of current emission standards for SORE.

OFFS-06 - TRANSPORT REFRIGERATION UNITS USED FOR COLD STORAGE: This measure is designed to advance zero and near-zero emission technology commercialization by increasing the early penetration of hybrid electric and electric standby equipped transport refrigeration units used for cold storage, and supporting the needed infrastructure developments. CARB would develop a regulation to limit stationary operating times of internal, combustion engines in phases.

OFFS-07 - LOW-EMISSION DIESEL REQUIREMENT: This measure is designed to reduce emissions from the portion of the heavy-duty fleet that will continue to operate on internal combustion engines. The proposed measure would put into place standards for Low Emission Diesel and require that diesel fuel providers sell steadily increasing volumes of Low-Emission Diesel until it comprises 50 percent of total diesel sales by 2031. Due to the magnitude of needed NOx reductions in the Basin and the large volumes of Low-Emission Diesel needed for full statewide implementation, the proposed measure would be phased-in with an implementation strategy that starts in the Basin, and subsequently expands statewide.

OFFS-08 - FURTHER DEPLOYMENT OF CLEANER TECHNOLOGIES: OFF-ROAD EQUIPMENT: This measure is designed to achieve further emission reductions for the Basin's attainment needs through a suite of additional actions, including greater penetration of zero and near-zero technologies through incentive programs, and emission benefits associated with the potential for worksite integration and efficiency, as well as connected and autonomous vehicle technologies. These emission reductions will be achieved through a combination of actions to be undertaken by both CARB and the SCAQMD.

2.8.5.6 Consumer Products Program

CPP-01 – CONSUMER PRODUCTS PROGRAM - The CARB SIP Strategy also includes measures to further reduce emissions of ROG from consumer products. CARB staff propose to evaluate the 2013-2015 data reported to the Consumer Products Program to identify strategies to achieve emission reductions from consumer products. The proposed measure may involve establishing new ROG limits for categories currently unregulated and/or lowering ROG limits for categories already regulated. Staff may investigate opportunities to establish alternative compliance options to provide flexibility to industry to comply with regulations, such as an emission cap to reduce ROG emissions from consumer products. This measure calls for an implementation schedule between 2020 and 2023.

2.8.6 SCAG'S REGIONAL TRANSPORTATION PLAN/SUSTAINABLE COMMUNITIES STRATEGY AND TRANSPORTATION CONTROL MEASURES

The SCAG, the Metropolitan Planning Organization for Southern California, is mandated to comply with federal and state transportation and air quality regulations. Further, SCAG has the responsibility of preparing and approving the portions of the AQMP related to regional demographic projections and integrated regional land use, housing, employment, and transportation programs, measures, and strategies. The SCAQMD combines its portion of the AQMP with those portions prepared by SCAG.

The transportation strategy and TCMs to be included as part of the 2016 AQMP are based on SCAG's adopted 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), which were developed in consultation with federal, state and local transportation and air quality planning agencies and other stakeholders.

The 2016 RTP/SCS TCMs portion of the 2016 AQMP consists of the following four related sections:

- Section I. As required by federal and state laws, SCAG is responsible for ensuring that the regional transportation plan, program, and projects are supportive of the goals and objectives of AQMPs/SIPs. SCAG is also required by state law to develop demographic projections and RTP/SCS control measures for the AQMPs/SIPs. SCAG prepares the RTP/SCS, which is updated every four years, and the Federal Transportation Improvement Plan biennially.
- Section II. RTP/SCS and TCMs. The 2016 RTP/SCS makes a concerted effort to integrate the region's transportation network with land uses in order to achieve a sustainable region over the coming decades. Accordingly, the Final 2016 RTP/SCS includes a host of regional strategies for addressing growth, land use and improving the region's transportation system.
    - ❑ Land Use Strategies
        - o Focus New Growth around Transit/High Quality Transit Areas (HQTAs)
        - o Plan for Growth around Livable Corridors

  - o Provide More Options for Short Trips/Neighborhood Mobility Areas
  - o Support Zero Emission Vehicles & Expand Electric Vehicle Charging Stations
  - o Support Local Sustainability Planning
  - o Protect Natural and Farm Lands
  - o Balance Growth Distribution between 500-Foot Buffer Areas and HQTAs
- ❑ Transportation Strategies
  - o Preserve Our Existing System
  - o Manage Congestion through Transportation Demand Management and Transportation System Management
  - o Expand Regional Transit System
  - o Expand Passenger Rail and Maintain High-Speed Rail Commitments
  - o Promote Active Transportation
  - o Improve Highway and Arterial Capacity
  - o Strengthen Regional Transportation Network for Goods Movement
  - o Improve Airport Ground Access

  Included within these transportation system improvements are TCM projects that reduce vehicle use or improve traffic flow or congestion conditions. TCMs include the following three main categories of transportation improvement projects and programs:

  - o Transit, intermodal transfer, and active transportation measures;
  - o High occupancy vehicle lanes, high occupancy toll lanes, and their pricing alternatives; and
  - o Information-based transportation strategies.

Appendix B herein and Appendix IV-C of the AQMP presents a list of TCM projects specifically identified and committed to in the 2016 AQMP.

- Section III. Reasonably Available Control Measure Analysis. As required by the CAA, a RACM analysis must be included as part of the overall control strategy in the AQMP to ensure that all potential control measures are evaluated for implementation and that justification is provided for those measures that are not implemented. 2016 AQMP, Appendix IV-C contains the RACM TCM component for the Basin's ozone and $PM_{2.5}$ control strategy. In accordance with U.S. EPA procedures, this analysis considers TCMs in the Final 2016 RTP/SCS, measures identified by the CAA, and relevant measures adopted in other ozone and $PM_{2.5}$ nonattainment areas of the country. Based on this comprehensive review, it is determined that the TCMs being implemented in the Basin are inclusive of all TCM RACM.

- Section IV. TCM BACM Analysis for 2006 PM2.5 NAAQS. The Basin has been reclassified as a "serious" nonattainment area under the 2006 PM2.5 NAAQS effective February 12, 2016. As a result, the Basin is required to implement BACMs including TCMs for the control of direct PM2.5 and PM2.5 precursors from on-road mobile sources. This section serves as the TCM BACM component for the 2006 PM2.5 SIP.

Following the applicable U.S. EPA guidance, the TCM BACM analysis consists of a review of on-going implementation of TCMs in the Basin, a review of TCM measures implemented in other "moderate" and "serious" PM2.5 nonattainment areas as well as "serious" PM10 nonattainment areas throughout the country, and a review of TCMs not implemented in the SCAG region. The analysis demonstrates that the TCM projects being implemented in the Basin constitute TCM BACM.

The emission benefits associated with the Final 2016 RTP/SCS are reflected in the 2016 AQMP projected baseline emissions. Tables 1-1 and 1-2 in the 2016 AQMP Appendix IV-C show that the amount of emission reductions from the RTP/SCS are significantly impacted by the change in vehicle fleet mix and vehicle emission factors. For example, assuming that the future EMFAC2014 vehicle fleet mix and emission factors remain the same as in 2012 (the 2016 RTP/SCS and 2016 AQMP base year), the 2016 RTP/SCS would yield a NOx emission reduction of 5.4 tons per day in 2021 and 9.8 tons per day in 2031 compared with the 2016 RTP/SCS baseline. However, if the future improvement in the fleet mix and emission factors as reflected in the EFMAC2014 are factored in, the estimated NOx emission reduction from the 2016 RTP/SCS would drop to 2.8 tons per day in 2023 and 4.5 tons per day in 2031.

2.8.7 SCAQMD PROPOSED CONTINGENCY MEASURES

Pursuant to federal CAA Section 172(c)(9), contingency measures are emission reduction measures that are to be automatically triggered and implemented if an area fails to attain the national ambient air quality standard by the applicable attainment date, or fails to make reasonable further progress toward attainment. Per U.S. EPA guidance (76 FR 57891), the contingency measure requirement may be satisfied with already adopted control measures, provided that the controls are above and beyond what is needed to demonstrate attainment with the NAAQS.

Chapter 4 of the 2106 AQMP discusses in detail how the contingency measure requirements are satisfied for the 24-hour PM2.5, the annual PM2.5 and the 8-hour ozone NAAQS.

2.8.8 COORDINATION WITH THE STATE'S GREENHOUSE GAS REDUCTION EFFORTS

The 2016 AQMP states that the path to achieving cleaner air and mitigating climate change requires the continued transformation of the energy sector. To encourage this transformation and maximize its co-benefits, SCAQMD will integrate a variety of implementation approaches in collaboration with other agencies with focus on the air quality benefits from GHG reduction measures such as renewable energy, smart grid technologies, and efficiency.

To this end, the 2016 AQMP incorporates several control measures to account for criteria pollutant co-benefits from federal, state and local mandates and programs to reduce GHG emissions, increase energy efficiency, along with renewable power sources. These control measures include ECC-01 and ECC-02 which account for co-benefits of GHG, efficiency, and renewable energy mandates such as AB 32, SB 350 and Title 24. Furthermore, control measure ECC-03 will pursue incentive programs to accelerate the implementation of onsite renewable energy, solar thermal, efficiency measures, along with smart grid adaptations.

CHAPTER 3

EXISTING ENVIRONMENTAL SETTING

3.1 Introduction
3.2 Air Quality
3.3 Energy
3.4 Hazards and Hazardous Materials
3.5 Hydrology and Water Quality
3.6 Noise
3.7 Solid and Hazardous Waste
3.8 Transportation and Traffic
3.9 Aesthetics

3.0 EXISTING ENVIRONMENTAL SETTING

3.1 INTRODUCTION

CEQA Guidelines §15360 (Public Resources Code Section 21060.5) defines "environment" as "the physical conditions that exist within the area which will be affected by a proposed project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historical or aesthetic significance." According to CEQA Guidelines §15125 (a), a CEQA document must include a description of the physical environment in the vicinity of the project, as it exists at the time the Notice of Preparation (NOP) is published from both a local and regional perspective. This environmental setting will normally constitute the baseline physical conditions by which a Lead Agency determines whether an impact is significant. The description of the environmental setting shall be no longer than is necessary to provide an understanding of the significant effects of the proposed project and its alternatives. Since this CEQA document is a programmatic EIR that covers SCAQMD's entire jurisdiction, the existing setting for each category of impact is described on a regional level.

The following subchapters describe the existing environmental setting for those environmental areas identified in the Initial Study (see Appendix A) that could be adversely affected by the proposed project. These areas include the following topics: aesthetics; air quality; energy; hazards and hazardous materials; hydrology and water quality; land use and planning; noise; solid and hazardous waste; and, transportation and traffic.

3.2 AIR QUALITY

3.2.1 CRITERIA AIR POLLUTANTS

The purpose of the 2016 AQMP is to address the federal 2008 8-hour ozone standard, the 2012 annual PM2.5 standard, and the 2006 24-hour PM2.5 standard, to satisfy the planning requirements of the federal CAA, and to provide an update on the strategy to meet the 1997 8-hour ozone NAAQS and 1979 1-hour ozone NAAQS. The 2016 AQMP also provides a preliminary evaluation of the 2015 federal 8-hour ozone standard. This chapter summarizes emissions that occurred in the Basin during the 2012 base year, and projected emissions in the years 2019, 2022, 2023, 2025, and 2031. More detailed emission data analyses are presented in Appendix III of the 2016 AQMP. The 2012 base year emissions inventory reflects adopted air regulations with current compliance dates as of 2012; whereas future baseline emissions inventories are based on adopted air regulations with both current and future compliance dates. A list of SCAQMD's and CARB's rules and regulations that are part of the base year and future year baseline emissions inventories is presented in Appendix III of the 2016 AQMP. SCAQMD is committed to implementing rules that are incorporated in the 2016 AQMP future baseline emissions inventories.

The emissions inventory is divided into four major classifications: point, area, on-road, and off-road sources. The 2012 base year point source emissions are based principally on reported data from facilities using SCAQMD's Annual Emissions Reporting Program. The area source emissions are estimated jointly by CARB and SCAQMD. The on-road emissions are calculated by applying CARB's EMFAC2014 emission factors to the transportation activity data provided by SCAG from their adopted 2016 RTP/SCS. CARB provides emissions inventories for off-road equipment which include construction, mining, gardening and agricultural equipment, ocean-going vessels, commercial harbor craft, locomotives and cargo handling equipment. Aircraft emissions are based on an updated analysis by SCAQMD in coordination with the local airport authorities. The future emission forecasts are primarily based on demographic and economic growth projections provided by SCAG. In addition, emission reductions resulting from SCAQMD regulations adopted by December 2015 and CARB regulations adopted by November 2015 are included in the future baseline projections.

It should be noted that 2012 is the baseline year used for the emissions inventory to develop the control strategy and future baseline emissions in the 2016 AQMP. However, the latest verifiable air quality data (from approved monitoring stations) is from 2015, which can be found in Chapter 2 of the 2016 AQMP and Subchapter 3.2 of the ~~Draft~~Final Program EIR. The most recent environmental topic data is from 2016 and was used for the CEQA baseline in determining environmental impacts because that was the time of the release of the NOP/IS, in accordance with CEQA requirements.

This chapter summarizes the major components of developing the base year and future baseline inventories. More detailed information, such as CARB's and SCAQMD's emission reductions resulting from adopted rules and regulations since the 2012 AQMP, growth factors, and demographic trends, are presented in Appendix III of the 2016 AQMP. In addition, the top ten source categories contributing to the emission inventories are identified in this chapter.

Understanding information about the highest emitting source categories leads to the identification of potentially more effective and/or cost effective control strategies for improving air quality.

3.2.1.1 Assumptions used to Develop Current Emission Inventories

Two inventories are prepared for the 2016 AQMP for the purpose of regulatory and SIP performance tracking and transportation conformity: an annual average inventory and a summer planning inventory. Baseline emissions data presented in this chapter are based on average annual day emissions (e.g., total annual emissions divided by 365 days) and seasonally adjusted summer planning inventory emissions. The 2016 AQMP uses annual average day emissions to estimate the cost-effectiveness of control measures, to rank control measure implementation, and to perform ozone and PM2.5 modeling and analysis. The summer planning inventory emissions are developed to capture the emission levels during a poor ozone air quality season, and are used to report emission reduction progress as required by the federal and California CAAs.

Detailed information regarding the emissions inventory development for the base year and future years, the emissions by major source category of the base year, and future baseline emission inventories are presented in Appendix III of the 2016 AQMP. Attachments A and B to Appendix III list the annual average and summer planning emissions, respectively by major source category for base year 2012, and attainment demonstration years of 2019, 2022, 2023, 2025 and 2031. Attachment C to Appendix III of the 2016 AQMP has the top VOC and NOx point sources which emitted greater than or equal to ten tons per year in 2012. Attachment D to Appendix III of the 2016 AQMP contains the on-road emissions by vehicle class and by pollutant. Attachment E to Appendix III of the 2016 AQMP shows emissions associated with the combustion of diesel fuel for various source categories.

3.2.1.1.1 Stationary Sources

Stationary sources can be divided into two major subcategories: point and area sources. Point sources are large emitters with one or more emission sources at a permitted facility with an identified location (e.g., power plants, refineries). These facilities have annual emissions of four tons or more of either VOC, NOx, SOx, PM, or annual emissions of over 100 tons of CO or toxic air contaminants (TACs). Facility owners/operators are required to report their criteria pollutant emissions and selected TACs to SCAQMD on an annual basis, if any of these thresholds are exceeded.

Area sources consist of many small emission sources (e.g., residential water heaters, architectural coatings, consumer products, as well as, permitted sources smaller than the above thresholds), which are distributed across the region. There are about 400 area source categories for which emissions are jointly developed by CARB and SCAQMD. The emissions from these sources are estimated using activity information and emission factors. Activity data are usually obtained from survey data or scientific reports (e.g., Energy Information Administration (EIA) reports for fuel consumption other than natural gas fuel, Southern California Gas Company for natural gas consumption, paint suppliers, and SCAQMD databases). The emission factors are based on rule compliance factors, source tests, manufacturers' product or technical specifications data, default factors (mostly from AP-42, U.S. EPA's published emission factor compilation), or weighted emission factors derived from the point sources in annual emissions reports. Socioeconomic data may also be used to estimate emissions over specific areas.

Appendix III of the 2016 AQMP has more detail regarding emissions from specific source categories such as architectural coatings, dairy cattle, oil and gas production operations, gasoline dispensing facilities, and green waste composting. Since the 2012 AQMP was finalized, new area source categories, such as liquefied petroleum gas (LPG) transmission losses, storage tank and pipeline cleaning and degassing, and architectural colorants were characterized and included in the emission inventories. These updates and new additions are listed below:

- Architectural Coatings Category: Over 60 area sources in this category were updated based on information provided as part of SCAQMD Rule 314 – Fees for Architectural Coatings annual reports.
- Oil and Gas Production Category: The emission estimation methodology for this area source category was revised to incorporate U.S. EPA's oil and gas production inventory model modified with California-specific emission factors and technologies.
- Gasoline Dispensing Facilities Category: The emission estimation methodology for this area source category was revised to include CARB staff's updated emission factors and activity data.
- Dairy Cattle: Ammonia and VOC emissions from dairy farms were revised based on the animal head count data reported to the Santa Ana Regional Water Quality Control Board.
- LPG Combustion Categories: The emissions from this category were revised based on the LPG consumption estimation for the Basin. The fraction of California LPG use in the Basin was estimated based on GHG data reported to CARB. The statewide total LPG consumption was retrieved from state Energy Data in 2013.
- Commercial and Industrial Natural Gas Combustion Categories: 2012 actual natural gas consumption data were used, instead of the projection from the 2012 AQMP.
- Composting Waste Disposal: Ammonia and VOC emissions expected from mulch making processes and natural decay were added in this category.
- Regional Clean Air Incentives Market (RECLAIM) NOx emissions: The future baseline was revised to include the 12 tons per day of RECLAIM Trading Credits (RTCs) reduction by December 2022 that was approved by the SCAQMD Governing Board in December 2015.

3.2.1.1.2 Mobile Sources

Mobile sources consist of two subcategories: on-road and off-road sources. On-road sources are from vehicles that are licensed to drive on public roads. Off-road sources are typically registered with the state and cannot be typically driven on public roads. On-road vehicle emissions are calculated by applying CARB's EMFAC2014 emissions factors to the transportation activity data provided by SCAG in their adopted 2016 RTP/SCS. Spatial distribution data from Caltrans's Direct Travel Impact Model (DTIM4) are used to generate gridded emissions for regional air quality modeling. Off-road emissions are calculated using CARB's category specific inventory models.

3.2.1.1.3 On-Road

CARB's EMFAC2014 model has undergone extensive revisions from the previous version (EMFAC2011) to make it more user-friendly, flexible, and to allow incorporation of larger amounts of data demanded by the current regulatory and planning processes. In addition to the model structural changes, other changes include:

- Revision of heavy-duty diesel (HD Diesel) truck emission rates: The emission factors for heavy heavy-duty diesel trucks were also updated using new test data on newer trucks (Model Year 2007 and newer) that more accurately represent the effectiveness of the control equipment used to meet the more stringent 2007 and 2010 emission standards.
- Incorporation of natural gas vehicles for select vehicle classes: Emission factors for natural gas powered solid waste collection vehicles and urban buses are now included in EMFAC2014 as these classes of vehicles have sufficient penetration of natural gas engines to warrant separate treatment.
- Accounting for federal and California regulations and standards adopted post-2010: The adopted regulations and standards include the state's Advanced Clean Car Program (LEV3), the April 2014 amendment to the Truck and Bus Regulation, the Tractor-Trailer Greenhouse Gas Regulation and the federal Heavy-Duty Greenhouse Gas Regulation.
- Socio-econometric modeling of population and VMT: EMFAC2014 incorporates the use of socioeconomic regression model forecasting methods to predict new vehicle sales and VMT growth trends. This allows the use of state and national economic indicators, fuel prices, and regional human population and vehicle ownership characteristics as parameters to more accurately predict vehicle sales and VMT trends.

More detailed information on the changes incorporated in EMFAC2014 can be found at http://www.arb.ca.gov/msei/categories.htm.

Figure 3.2-1 compares the on-road emissions estimated using EMFAC2011 in the 2012 AQMP and EMFAC2014 used in the 2016 AQMP, respectively for base year 2012, and attainment demonstration years of 2023, and 2031. It should be noted that the comparison for 2012 reflects changes in methodologies, whereas the comparison for 2023 and 2031 also includes adopted rules and updated growth projections since the release of EMFAC2011, which was the basis of the 2012 AQMP on-road emissions.

FIGURE 3.2-1 (REVISED)

Comparison of On-Road Emissions Estimated using EMFAC2011 in the 2012 AQMP and EMFAC2014 in the 2016 AQMP
VOC and NOx emissions represent Summer Planning and SOx & PM2.5 are Annual Average Inventory.

For 2012, EMFAC2014's newer methodologies show higher emissions of NOx and VOCs. For the future years 2023 and 2031, in general, the emissions are lower in EMFAC2014 as compared to EMFAC2011. The lower emissions can be attributed to additional rules and regulations, more stringent standards, and updates to the heavy-duty emission factors.

Also evident in Figure 3.2-1 is the change in the rate of emission reductions. The rate of change in the emissions in the early years (2012 to 2023) is significantly larger than that shown further in the later years (2023 to 2031). This is due to the implementation of the rules and regulations, most of which will be fully implemented by 2023 (e.g., CARB's Truck and Bus rule requires all trucks to meet the 2010 standards by 2023). The effect of the rules and regulations are significant, showing reductions of over 67 percent in NOx emissions and close to 60 percent in VOC emissions between 2012 and 2023, even with increases in fleet population. More modest reductions are predicted from continued fleet turnover, but fleet growth is beginning to outpace the emissions benefits of fleet turnover in the later years. Further emission reductions will require fleets to adopt the use of even cleaner equipment than the current standards require.

3.2.1.1.4 Off-Road

Emissions from off-road vehicle categories are primarily based on estimated activity levels and emission factors. Separate emission estimation models have been developed for the many categories of off-road equipment. More information on these models can be found at the following link: http://www.arb.ca.gov/msei/categories.htm. Several of these models have been updated since the release of the 2012 AQMP. The major updates include:

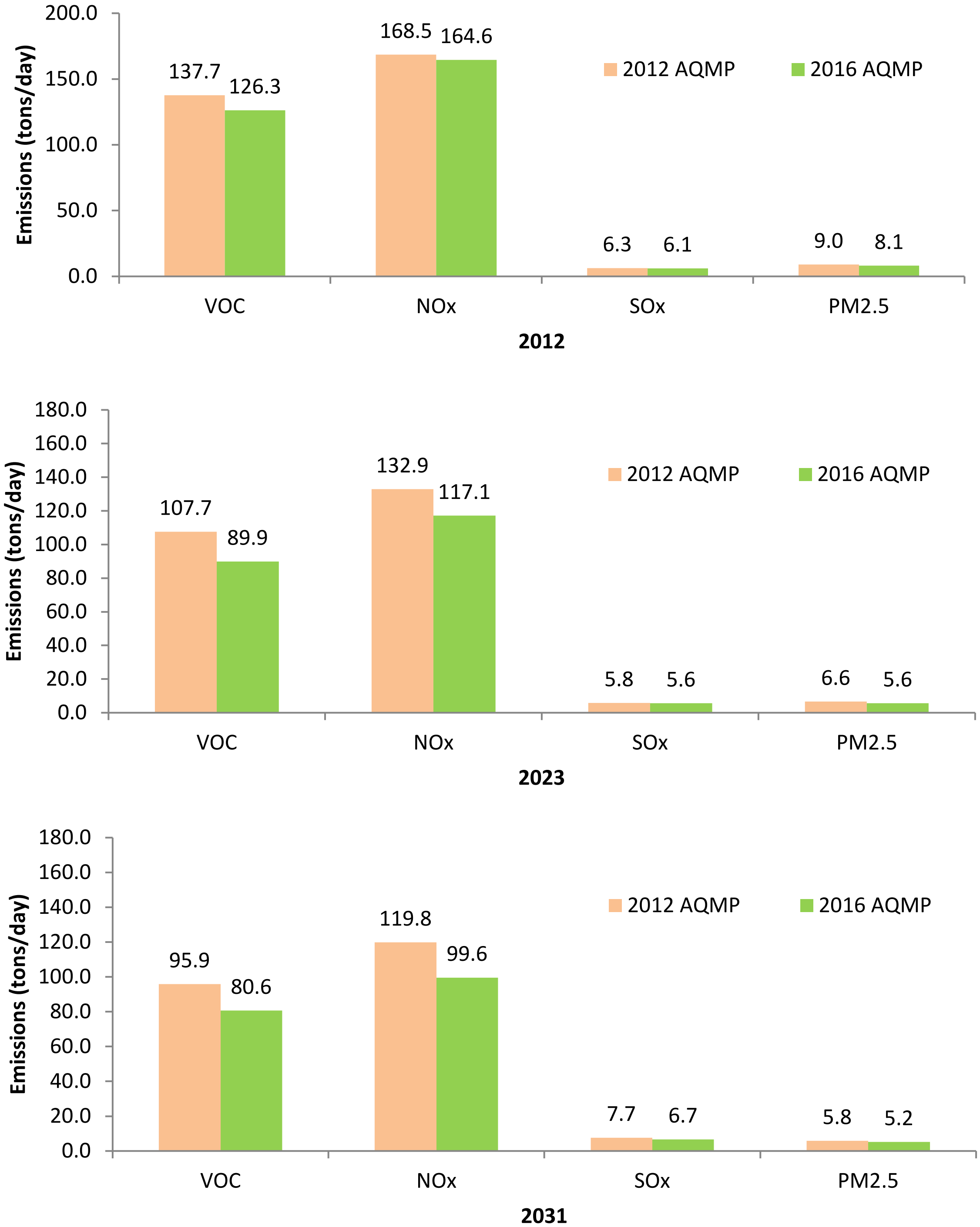
- Locomotives: The emissions model methodology for the freight locomotive category was completely revised. In addition, activity was updated using data from the Surface Transportation Board and Federal Highway Administration's Freight Analysis Framework. Population information was derived from the Association of American Railroads' population data.
- Ocean Going Vessels: New lower growth projections were developed and incorporated into the model using more recent information from the Federal Highway Administration's Freight Analysis Framework model and other forecasts performed for the San Pedro Bay Ports. NOx control factor calculations were updated to more appropriately represent the engine Tier levels.
- Commercial Harbor Craft: The vessel turnover rate methodology was improved to better reflect the observed age distribution. A more representative reduced turnover rate is used, which improves consistency with other off-road emissions model methodologies.
- Pleasure Craft and Off-Highway Recreational Vehicles: New survey information and DMV data were used to update the population and activity, and new emissions testing data were used to update the emission factors in newly developed models for these two categories.
- Cargo Handling Equipment: The model was updated to use growth factors consistent with those developed for ocean going vessels.

- Farm Equipment: The inventory was completely revised resulting in a new inventory based on updated equipment population, equipment age distribution, activity, load factors, and turnover practices.
- Aircraft: The aircraft emissions inventory is updated for the 2012 base year and the 2023 and 2031 forecast years based on the latest available activity data and calculation methodologies. A total of 43 airports were identified as having aircraft operations within the SCAQMD boundaries including commercial air carrier, air taxi, general aviation, and military aircraft operations. The sources of activity data included airport operators (for several commercial and military airports), Federal Aviation Administration's (FAA) databases (i.e., Bureau of Transportation Statistics, Air Traffic Activity Data System, and Terminal Area Forecast), and SCAG's projections. For commercial air carrier operations, SCAG's 2023 and 2031 forecasts, which are consistent with the forecast adopted for the 2016 RTP, were used reflecting the future aircraft fleet mix. The emissions calculation methodology was primarily based on the application of the FAA's Emissions and Dispersion Modeling System (EDMS) model for airports with detailed activity data for commercial air carrier operations (by aircraft make and model). For other airports and aircraft types (i.e., general aviation, air taxi, and military), the total number of landing and takeoff activity data was used in conjunction with the U.S. EPA's average emission factors by major aircraft type (e.g., general aviation, air taxi, and military). For the intermediate milestone years, the emissions inventories were linearly interpolated between 2012, 2023 and 2031.

Figure 3.2-2 shows a comparison between the off-road baseline emissions in the 2012 AQMP and the 2016 AQMP for the base year 2012, and attainment demonstration years of 2023, and 2031. Overall, the updates to the off-road categories result in lower emissions than those used in the 2012 AQMP. It should be noted that the comparison for 2012 reflects changes in methodology, but the comparison for the rest of the years also includes adopted rules and updated growth projections since the release of off-road inventory in the 2012 AQMP. Similar to what is shown for the on-road category, the rate of reductions in emissions of NOx and VOC is significantly larger in early years (2012 to 2023) compared to the rate seen in the later years (2023 to 2031). This is the result of the rules and regulations adopted at the state and federal levels for most of the off-road categories. As most will be fully implemented by 2023, only modest reductions will be achieved as a result of continued fleet turnover beyond 2023. Without additional rules or programs for further reductions, growth in emissions from increases in vehicle population outweighs the emissions benefits associated with fleet turnover to newer equipment. As projected for the on-road fleet, further emission reductions will require off-road fleets to use even cleaner equipment than current standards require.

FIGURE 3.2-2 (REVISED)

Comparison of Off-Road Emissions between 2012 AQMP and 2016 AQMP.
VOC & NOx – Summer Planning; SOx & PM2.5 – Annual Average Inventory



3.2.1.1.5 Uncertainty in the Inventory

An effective AQMP relies on complete and accurate emissions inventories. Over the years, significant improvements have been made in emission estimates for sources affected by control measures. Increased use of continuous monitoring and source tests has contributed to the improvement in point source inventories. Technical assistance to facilities and auditing of reported emissions by SCAQMD staff have also improved the accuracy of emissions inventories. Area source inventories that rely on average emission factors and regional activities have inherent uncertainty. Industry-specific surveys and source-specific studies during rule development have provided much needed refinement to the emissions estimates.

Mobile source inventories remain the greatest challenge due to new information continuously collected from the large number and types of equipment and engines. Every AQMP revision provides an opportunity to further improve the current knowledge of mobile source inventories. The 2016 AQMP is not an exception. As described earlier, many improvements were included in EMFAC2014, and such work is ongoing. However, it should be acknowledged that there are still areas that could be significantly improved if better data were available. Technological changes and advancement in the area of electric, hybrid, flexible fuel, and fuel cell vehicles coupled with changes in future gasoline prices all add uncertainty to the on-road emissions inventory. Overall, the 2016 AQMP inventory is based on the most current data and methodologies, resulting in the most accurate inventory available.

Relative to future growth, there are many challenges inherent in making accurate projections, such as where vehicle trips will occur, the distribution between various modes of transportation (such as trucks and trains), as well as estimates for population growth and the number and type of jobs. Forecasts are made with the best information available; nevertheless, there is uncertainty in emissions projections. AQMP updates are generally developed every three to four years, thereby allowing for frequent updates and improvements to the inventories.

3.2.1.1.6 Gridded Emissions

The air quality modeling region for the 2016 AQMP extends to Southern Kern County in the north, the Arizona border in the east, northern Mexico in the south and more than 100 miles offshore to the west. The modeling area is divided into a grid system comprised of four kilometer square grid cells defined by Lambert Conformal coordinates. Both stationary and mobile source emissions are allocated to individual grid cells within the modeled area. In general, daily modeling emissions are used. Variations in temperature, hours of operation, speed of motor vehicles, and/or other factors are considered in developing gridded motor vehicle emissions. The gridded emissions data used for both PM2.5 and ozone modeling applications differ from the average annual day or planning inventory emission data in two respects: (1) the air quality modeling region covers larger geographic areas than the Basin; and (2) emissions used in air quality modeling represent day-specific instead of average or seasonal conditions. For PM2.5, the annual average day is used in the air quality modeling, which represents the characteristic of emissions that contribute to year-round particulate impacts. The summer planning inventory, which is used for ozone modeling analyses, focuses on the warmer months (May through October) when evaporative VOC emissions play an important role in ozone formation.

3.2.1.2 Base Year Emissions - 2012 Emissions Inventory

Table 3.2-1A compares the summer planning emissions between the 2012 base year in the 2016 AQMP and the projected 2012 emissions in the 2012 AQMP by major source category for VOC and NOx. Table 3.2-1B compares the annual average emissions between the 2012 base year in the 2016 AQMP and the projected 2012 emissions in the 2012 AQMP for SOx and PM2.5. It should be noted that the comparison for 2012 reflects updates in methodology, differences between growth projections and actual data, and adopted rules since the release of the 2012 AQMP. Specifically, the growth projection employed in the 2012 AQMP did not fully capture the impact of the economic recession which occurred between 2008 and 2010.

TABLE 3.2-1A

Comparison of VOC and NOx Emissions By Major Source Category of 2012 Base Year in Draft 2016 AQMP and Projected 2012 in Final 2012 AQMP Summer Planning Inventory (tons/day[1])

SOURCE CATEGORY	2012 AQMP	Draft 2016 AQMP	% Change	2012 AQMP	Draft 2016 AQMP	% Change
	VOC			NOx		
STATIONARY SOURCES						
Fuel Combustion	12.9	11.~~3~~4	-12%	29.4	29.2	~~-1~~5%
Waste Disposal	12.1	14.~~2~~1	17%	1.5	2.3	50%
Cleaning and Surface Coatings	41.7	35.6	-15%	0	0	0%
Petroleum Production and Marketing	40.2	29.~~9~~2	-~~26~~27%	0	0	0%
Industrial Processes	13.8	10.8	-21%	0	0	0%
Solvent Evaporation:						
Consumer Products	86.6	86.5	0%	0	0	0%
Architectural Coatings	21.5	13.3	-38%	0	0	0%
Others	2.0	2.4	17%	0	0	0%
Misc. Processes	9.7	~~6.7~~7.8	~~-31~~20%	15.5	14.~~6~~5	-6%
RECLAIM SOURCES	0	0	0%	27.2	19.6	-28%
Total Stationary Sources	**240**	**211**	**-12%**	**74**	**~~66~~65**	**-13~~1~~%**
MOBILE SOURCES						
On-Road Vehicles	138.4	~~164.9~~162.4	~~19~~17%	285.2	~~297.2~~293.1	~~4~~3%
Off-Road Vehicles	137.7	126.~~1~~3	-8%	168.5	~~165.7~~164.6	-2%
Total Mobile Sources	**276**	**~~291~~289**	**5%**	**454**	**~~463~~458**	**~~2~~1%**
TOTAL	**516**	**~~502~~500**	**-3%**	**528**	**~~529~~522**	**~~0~~-1%**

[1] Values may not sum due to rounding errors

TABLE 3.2-1B

Comparison of SOx and PM2.5 Emissions By Major Source Category of 2012 Base Year in 2016 AQMP and Projected 2012 in 2012 AQMP Annual Average (tons/day[1])

SOURCE CATEGORY	2012 AQMP	Draft 2016 AQMP	% Change	2012 AQMP	Draft 2016 AQMP	% Change
	SOx			PM2.5		
STATIONARY SOURCES						
Fuel Combustion	1.9	1.9	~~0~~-1%	5.6	5.~~7~~6	1%
Waste Disposal	0.4	0.5	20%	0.2	0.2	~~0~~-13%
Cleaning and Surface Coatings	0	0	0%	1.5	1.4	-5%
Petroleum Production and Marketing	0.6	0.4	-26%	1.6	1.5	-6%
Industrial Processes	0.02	0.1	400%	6.7	6.4	-6%
Solvent Evaporation:						
Consumer Products	0	0	0%	0	0	0%
Architectural Coatings	0	0	0%	0	0	0%
Others	0	0	0%	0	0	0%
Misc. Processes	1.0	0.5	-47%	32.5	~~29.1~~28.8	-11%
RECLAIM SOURCES	11.8	6.9	-42%	0	0	0%
Total Stationary Sources	**16**	**10**	**-34%**	**48**	**44**	**-~~8~~9%**
MOBILE SOURCES						
On-Road Vehicles	2.1	2.~~1~~0	~~0~~-2%	14.6	14.~~6~~4	~~0~~-1%
Off-Road Vehicles	6.3	6.1	-~~3~~2%	9.0	~~7.9~~8.1	-~~12~~10%
Total Mobile Sources	**8**	**8**	**-2%**	**24**	**23**	**-5%**
TOTAL	**24**	**18**	**-23%**	**72**	**~~67~~66**	**-7%**

[1] Values may not sum due to rounding errors

Overall, there is a minor net decrease in VOC emissions in the 2016 AQMP inventory as compared to the 2012 AQMP projections. Estimates of stationary source VOC emissions have decreased by approximately 12 percent, but mobile VOC source emissions have increased by five percent. Overall NOx emissions remain unchanged between the 2016 AQMP inventory and the 2012 AQMP projection. As in the VOC category, stationary source NOx emissions have been revised downward and mobile source emissions have been revised slightly upward. Of note in the stationary source categories are the emission changes associated with the architectural coatings, RECLAIM categories, natural gas and LPG combustion sources, and farming operations. Architectural coatings emissions were updated for the 2016 AQMP using information provided as part of SCAQMD Rule 314 – Fees for Architectural Coatings annual reports, resulting in the lower emission estimate. The RECLAIM emissions cap was used to project the NOx emissions in the 2012 AQMP inventory, while in 2012, the actual emissions were lower than the cap by seven tons per day (tpd). Use of additional actual reported information in lieu of projected emissions (used in the 2012 AQMP to estimate the 2012 emissions) explain the majority of the remaining emission differences. Refer to Appendix III for details.

For the mobile source category, the updates described earlier to the on-road emissions model EMFAC2014 resulted in the 19 percent and four percent increase in VOC and NOx emissions, respectively. Updates to several of the off-road category emission estimates resulted in the eight percent decrease in VOC emissions and a modest two percent decrease in NOx emissions. Updates were completed for locomotives, ocean going vessels, cargo handling equipment, commercial harbor craft, farming equipment, pleasure craft, and off-highway recreational vehicles.

Estimates of SOx emissions are 23 percent lower in the 2016 AQMP emissions inventory than 2012 AQMP projections. This is largely due to the difference in the use of actual reported information in lieu of projected emissions in the RECLAIM sources. Estimates of direct PM2.5 from stationary and mobile sources are modestly lower in the 2016 AQMP leading to a decrease of seven percent. This revised estimation is largely due to changes in the emissions estimates from miscellaneous stationary processes and decreases in off-road vehicle emissions.

Table 3.2-2 shows the 2012 annual average and summer planning emissions inventory by major source category. Stationary sources are subdivided into point (e.g., chemical manufacturing, petroleum production, and electric utilities) and area sources (e.g., architectural coatings, residential water heaters, consumer products, and permitted sources smaller than the emission reporting threshold – generally 4 tons per year (tpy)). Mobile sources consist of on-road (e.g., passenger cars and heavy-duty trucks) and off-road sources (e.g., trains and ships). Entrained road dust is also included.

Figure 3.2-3 characterizes relative contributions by stationary and mobile source categories to the baseline inventory. On- and off-road sources continue to be major contributors for each of the five pollutants. Overall, total mobile source emissions account for almost 60 percent of the VOC and 90 percent of the NOx emissions for these two ozone-forming pollutants and 95 percent of the CO emissions. The on-road mobile category alone contributes over 30 percent of the VOC and almost 56 percent of the NOx emissions. For directly emitted PM2.5, mobile sources represent approximately 35 percent of the emissions with another 12 percent due to vehicle-related entrained road dust. Stationary sources emit the majority of the SOx emissions with the point source category contributing 50 percent of the SOx emissions in the Basin. Area sources play a major role in VOC emissions, emitting about 3.5 times more than point sources. Area sources, including sources such as commercial cooking, are the predominant source of directly emitted PM2.5 emissions (42 percent).

Figure 3.2-4 shows the fraction of the 2012 inventory by responsible agency for VOC, NOx, SOx, and directly emitted PM2.5. U.S. EPA and CARB have primary authority to regulate emissions from mobile sources. U.S. EPA's authority applies to aircraft, locomotives, ocean going vessels, and some categories of on-road and off-road mobile equipment. CARB has authority over the remainder of the mobile sources, and consumer products. SCAQMD has authority over most area sources and all point sources. As can be seen in Figure 3.2-4, most of the NOx and VOC emissions in the SCAQMD are from sources that fall under the primary jurisdiction of U.S. EPA and CARB. For example, almost 90 percent of the NOx and over 75 percent of the VOC emissions are from sources primarily under CARB and U.S. EPA control. Conversely, 56 percent of the SOx emissions and 65 percent of the directly emitted PM2.5 emissions are from sources under SCAQMD control. NOx and VOC are important precursors to ozone and PM2.5 formation, and SOx along with directly emitted PM2.5, contribute to the region's PM2.5 nonattainment challenges. This illustrates that actions at the local, state, and federal level are needed to ensure the region attains the federal ambient air quality standards.

TABLE 3.2-2

Summary of Emissions By Major Source Category: 2012 Base Year Average Annual Day and Summer Planning (tons/day[1])

SOURCE CATEGORY	Annual Average						Summer Planning	
	VOC	NOx	CO	SOx	$PM_{2.5}$	NH3	VOC	NOx
STATIONARY SOURCES								
Fuel Combustion	11	28	49	2	6	9	11	~~29~~28
Waste Disposal	14	2	1	0	0	~~9~~5	14	2
Cleaning and Surface ngs	34	0	0	0	1	0	36	0
Petroleum Production and Marketing	~~30~~29	0	5	0	2	0	~~30~~29	0
Industrial Processes	10	0	0	0	6	9	11	0
Solvent Evaporation								
Consumer Products	87	0	0	0	0	0	87	0
Architectural ngs	13	0	0	0	0	0	13	0
Others	2	0	0	0	0	1	2	0
Misc. Processes[2]	~~12~~13	21	~~55~~54	1	29	~~35~~38	~~7~~8	15
RECLAIM Sources	0	19	0	7	0	0	0	20
Total Stationary Sources	**~~213~~212**	**70**	**110**	**10**	**44**	**~~64~~63**	**211**	**~~66~~65**
MOBILE SOURCES								
On-Road Vehicles	~~160~~158	~~321~~317	~~1354~~1328	2	~~15~~14	18	~~165~~162	~~297~~293
Off-Road Vehicles	100	~~155~~153	686	6	8	0	126	~~166~~165
Total Mobile Sources	**~~260~~258**	**~~476~~470**	**~~2040~~2014**	**8**	**23**	**18**	**~~291~~289**	**~~463~~458**
TOTAL	**~~473~~470**	**~~546~~540**	**~~2151~~2123**	**18**	**~~67~~66**	**~~82~~81**	**~~502~~500**	**~~529~~522**

[1] Values may not sum due to rounding errors
[2] Includes entrained road dust

FIGURE 3.2-3 (REVISED)
Relative Contribution by Source Category to 2012 Emission Inventory.
(VOC & NOx – Summer Planning; CO, SOx, & PM2.5 – Annual Average Inventory)

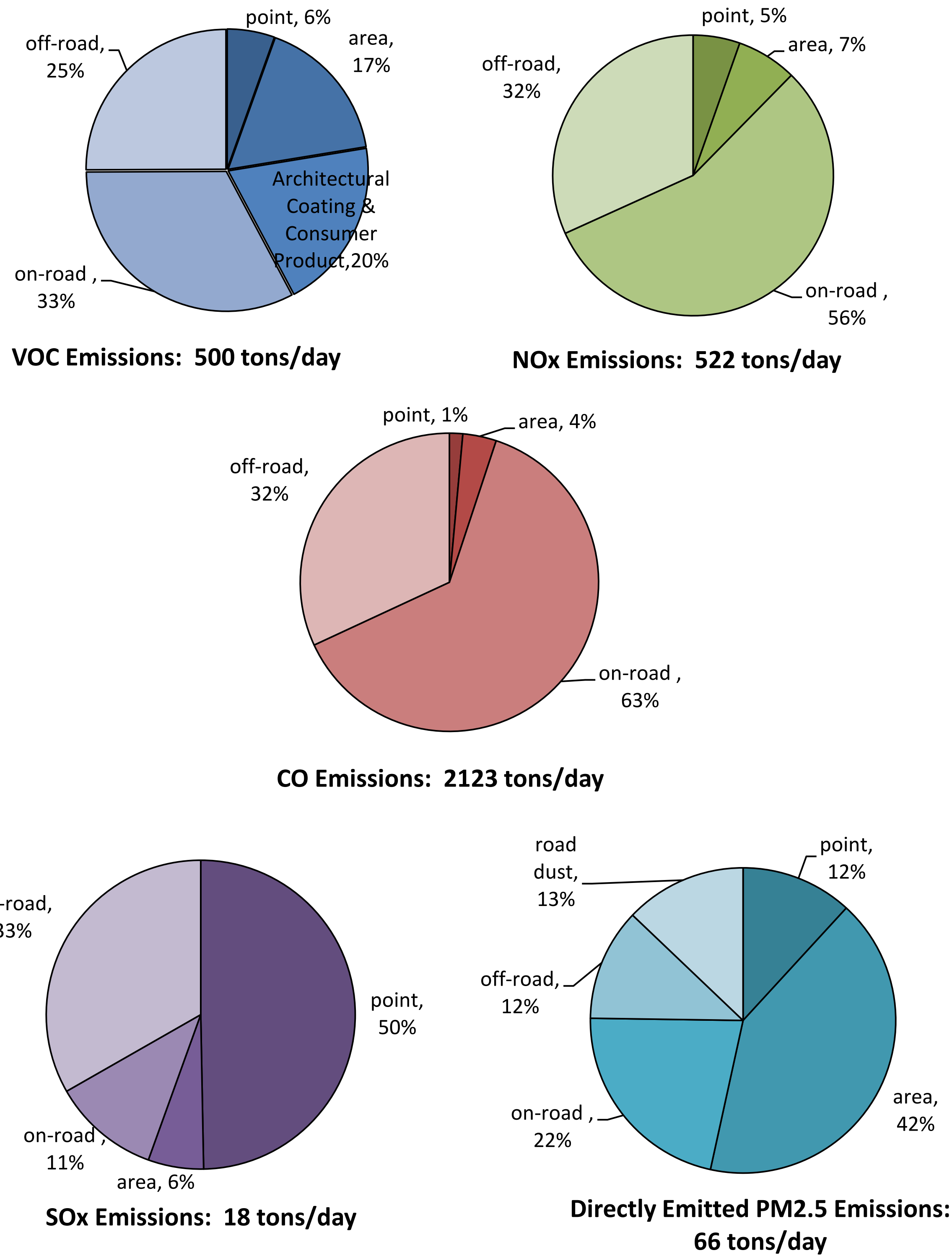
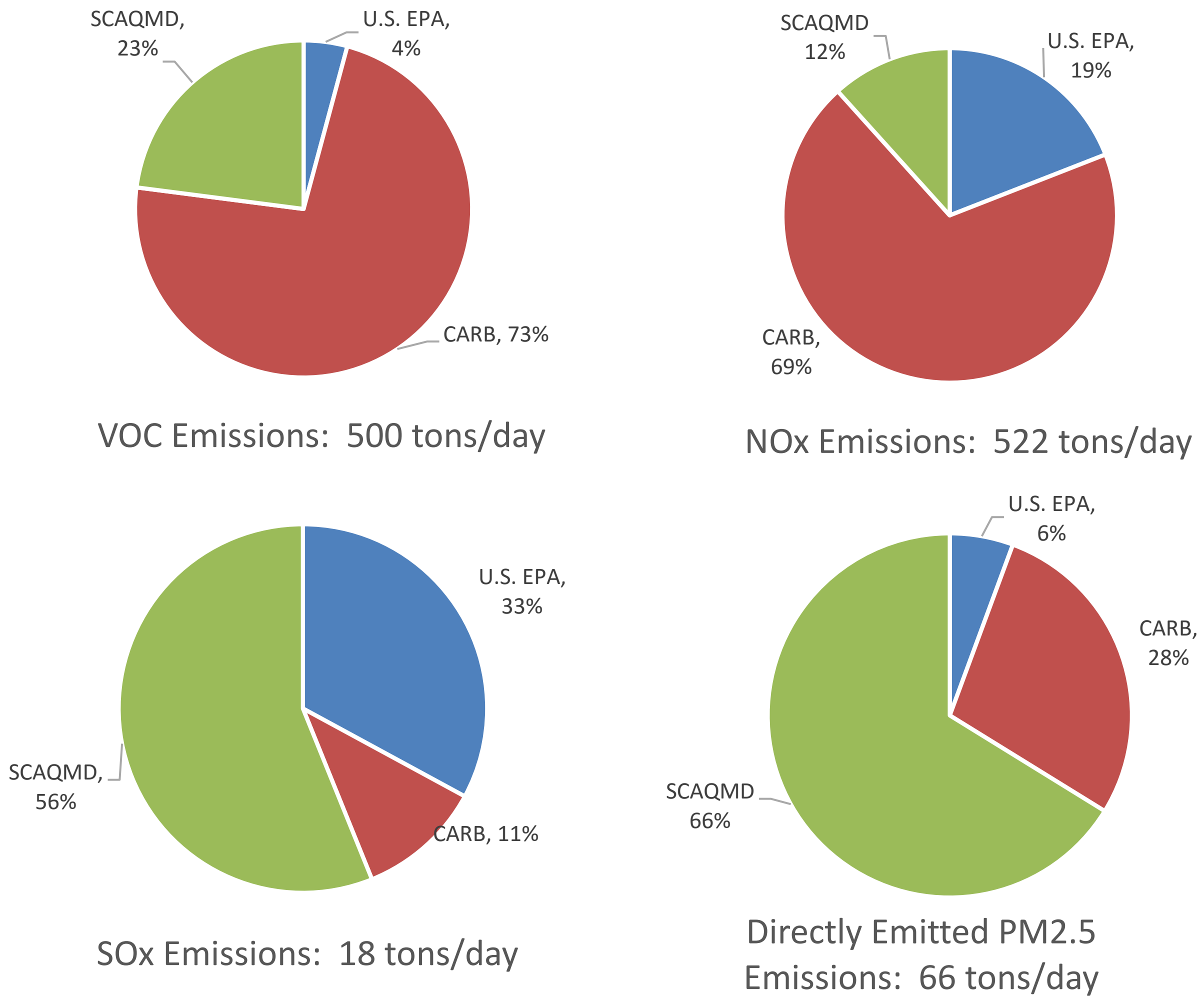


FIGURE 3.2-4 (REVISED)

2012 Emission Inventory Agency Primary Responsibility
(VOC & NOx – Summer Planning; SOx, & PM2.5 – Annual Average Inventory)



(Taken from 2016 AQMP – Chapter 3)

3.2.1.3 Future Emissions

3.2.1.3.1 Data Development

Inventories were developed for 2012, 2019, 2022, 2023, 2025, and 2031. Year 2012 is the base-year for the attainment demonstrations. Years 2023 and 2031 are the attainment demonstration years for the federal 8-hour ozone standards of 80 ppb (revoked) and 75 ppb, respectively. The 2022 inventory was developed to show attainment for the revoked 1-hour ozone standard (120 ppb). The 2019 and 2025 inventories were used to demonstrate attainment for the federal 24-hour and annual PM2.5 standards, respectively.

Future-year stationary source emissions were divided into RECLAIM and non-RECLAIM emissions. Future NOx and SOx emissions from RECLAIM sources are estimated based on their allocations as specified by SCAQMD Rule 2002 –Allocations for NOx and SOx. The forecasts for non-RECLAIM emissions were derived using: (1) emissions from the 2012 base year, (2) expected controls after implementation of SCAQMD rules adopted by December 2015 and CARB rules adopted as of November 2015, and (3) activity growth in various source categories between the base and future years.

Demographic growth forecasts for various socioeconomic categories (e.g., population, housing, employment by industry), developed by SCAG for the 2016 RTP/SCS, were used. Industry growth factors for 2012, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2025, 2026, 2031, and 2037 were also provided by SCAG, and interim years were calculated by linear interpolation. Table 3.2-3 summarizes key socioeconomic parameters used in the 2016 AQMP for emissions inventory development.

Current forecasts indicate that this region will experience a population growth of seven percent between 2012 and 2023, with a seven percent increase in VMT and a population growth of 12 percent by the year 2031 with an eight percent increase in VMT.

As compared to the projections in the 2012 AQMP, the current 2023 projections in the 2016 AQMP predict a population of about 200,000 fewer people (2.8 percent less), 100,000 more total employment (1.2 percent more), and 11 million miles more in the daily VMT forecast (2.7 percent more).

3.2.1.3.2 Summary of Future Baseline Emissions

To illustrate trends in the future baseline emissions inventories, emissions data by source categories (point, area, on-road mobile and off-road mobile sources) and by pollutant are presented in Tables 3.2-4A through 3.2-4E for the years 2019, 2022, 2023, 2025, and 2031. Baseline inventories are projected future emissions that reflect already adopted rules and regulations, but not additional controls proposed in the 2016 AQMP. This is in contrast to the 2012 base year emission inventory, which captures the actual 2012 emissions and is used as a basis for the projection of future inventories. Tables 3.2-4A through 3.2-4E provide annual average, as well as summer planning inventories. Emissions inventories for 2021, the "moderate" annual PM2.5 attainment deadline, can be found in Appendix III of the 2016 AQMP.

TABLE 3.2-3

Baseline Demographic Forecasts in the 2016 AQMP and the Final 2012 AQMP

CATEGORY	2012	2023	2023 % GROWTH FROM 2012	2031	2031 % GROWTH FROM 2012
Population (Millions)	15.9	17.1	7%	17.9	12%
Housing Units (Millions)	5.1	5.7	10%	6.0	16%
Total Employment (Millions)	6.7	7.8	16%	8.2	23%
Daily VMT (Millions)	380	407	7%	409	8%

Without any additional control measures, VOC and NOx emissions are expected to decrease due to existing regulations, such as controls for on- and off-road equipment, new vehicle standards, and the RECLAIM program. However, consistent with what was shown earlier with the mobile source categories, the emissions of SOx and PM2.5 show increases after 2022, when most of the rules and regulations will be fully implemented. Increases in emissions due to increase in population and activity outpace the emission reductions from introducing newer and cleaner equipment and vehicles. Figure 3.2-5 illustrates the relative contribution to the 2031 inventory by source category. A comparison of Figures 3.2-3 and 3.2-5 indicates that the on-road mobile category continues to be a major contributor to CO and NOx emissions. However, because of the implementation of most of the mobile source rules and regulations by 2023, 2031 on-road mobile sources account for much less of the VOC, NOx, and CO emissions as compared to 2012; about 14 percent of total VOC emissions compared to 33 percent in 2012; about 30 percent of total NOx emissions compared to 56 percent in 2012; and about 26 percent of total CO emissions compared to 63 percent in 2012. For directly emitted PM2.5, mobile sources will represent 23 percent of the emissions with another 14 percent due to vehicle-related entrained road dust, a reduction from the mobile source contribution in the base-year. It is projected that stationary sources will emit the majority of the SOx emissions, with the point source category contributing 57 percent of the SOx emissions in the Basin. In 2031, area sources will play even a larger role in VOC emissions, emitting more than point sources and mobile sources combined. Area sources will become the major contributor to VOC emissions from 37 percent in 2012 to 54 percent in 2031 and are projected to remain as the predominant source of directly emitted PM2.5 emissions (49 percent).

TABLE 3.2-4A

Summary of Emissions By Major Source Category: 2019 Baseline (24-hr PM2.5 attainment year) Average Annual Day and Summer Planning (tons/day[1])

SOURCE CATEGORY	Annual Average						Summer Planning	
	VOC	NOx	CO	SOx	PM2.5	NH3	VOC	NOx
STATIONARY SOURCES								
Fuel Combustion	11	23	~~49~~48	2	6	~~8~~9	11	~~24~~23
Waste Disposal	15	2	1	1	0	~~8~~6	~~15~~16	2
Cleaning and Surface Coatings	42	0	0	0	2	0	~~44~~43	0
Petroleum Production and Marketing	21	0	5	0	2	0	21	0
Industrial Processes	12	0	1	0	7	9	13	0
Solvent Evaporation:								
Consumer Products	88	0	0	0	0	0	88	0
Architectural Coatings	12	0	0	0	0	0	12	0
Others	2	0	0	0	0	1	3	0
Misc. Processes[2]	~~12~~13	~~15~~14	~~57~~56	1	31	~~34~~35	~~6~~7	10
RECLAIM Sources[3]	0	23	0	6	0	0	0	23
Total Stationary Sources	**~~215~~214**	**~~63~~62**	**~~113~~111**	**10**	**47**	**60**	**213**	**~~60~~59**
MOBILE SOURCES								
On-Road Vehicles	~~84~~82	~~170~~167	~~653~~639	2	11	14	~~87~~86	~~159~~155
Off-Road Vehicles	79	~~130~~124	~~698~~697	5	6	0	~~99~~98	~~139~~133
Total Mobile Sources	**~~163~~161**	**~~300~~291**	**~~1351~~1336**	**7**	**17**	**14**	**~~186~~184**	**~~298~~289**
TOTAL	**~~378~~376**	**~~363~~353**	**~~1464~~1447**	**~~16~~17**	**64**	**74**	**~~399~~398**	**~~358~~347**

[1] Values are rounded to nearest integer and may not sum due to rounding
[2] Includes entrained road dust
[3] Includes 2015 RECLAIM NOx shaves

TABLE 3.2-4B

Summary of Emissions By Major Source Category: 2022 Baseline (1-hr ozone attainment year) Average Annual Day and Summer Planning (tons/day[1])

SOURCE CATEGORY	Annual Average						Summer Planning	
	VOC	NOx	CO	SOx	$PM_{2.5}$	NH3	VOC	NOx
STATIONARY SOURCES								
Fuel Combustion	11	~~23~~22	~~50~~49	2	6	9	11	23
Waste Disposal	15	2	1	1	0	~~8~~6	~~16~~17	3
Cleaning and Surface Coatings	45	0	0	0	2	0	47	0
Petroleum Production and Marketing	~~21~~20	0	5	0	2	0	~~21~~20	0
Industrial Processes	~~13~~12	0	1	0	~~8~~7	9	13	0
Solvent Evaporation:								
Consumer Products	90	0	0	0	0	0	90	0
Architectural Coatings	12	0	0	0	0	0	12	0
Others	3	0	0	0	0	1	3	0
Misc. Processes[2]	~~12~~13	~~14~~13	56	1	~~32~~31	~~33~~35	~~6~~7	10
RECLAIM Sources[3]	0	15	0	6	0	0	0	15
Total Stationary Sources	**220~~1~~**	**53**	**~~113~~112**	**10**	**48**	**60**	**~~219~~220**	**~~51~~50**
MOBILE SOURCES								
On-Road Vehicles	~~69~~68	~~128~~125	~~509~~498	2	10	13	~~72~~71	~~120~~117
Off-Road Vehicles	74	~~119~~113	~~716~~715	5	6	0	92	~~126~~120
Total Mobile Sources	**~~144~~142**	**~~247~~238**	**~~1226~~1213**	**7**	**16**	**13**	**~~165~~163**	**~~246~~237**
TOTAL	**~~365~~362**	**~~300~~290**	**~~1339~~1325**	**17**	**64**	**73**	**383**	**~~297~~287**

[1] Values are rounded to nearest integer and may not sum due to rounding
[2] Includes entrained road dust
[3] Includes 2015 RECLAIM NOx shaves

TABLE 3.2-4C

Summary of Emissions By Major Source Category: 2023 Baseline (1997 8-hr ozone attainment year) Average Annual Day and Summer Planning (tons/day[1])

SOURCE CATEGORY	Annual Average						Summer Planning	
	VOC	NOx	CO	SOx	PM2.5	NH3	VOC	NOx
STATIONARY SOURCES								
Fuel Combustion	11	~~23~~22	~~50~~49	2	6	9	11	~~23~~22
Waste Disposal	~~16~~15	2	1	1	0	~~8~~6	~~16~~17	3
Cleaning and Surface Coatings	46	0	0	0	2	0	~~48~~47	0
Petroleum Production and Marketing	20	0	5	0	2	0	~~21~~20	0
Industrial Processes	13	0	1	0	8	9	14	0
Solvent Evaporation:								
Consumer Products	90	0	0	0	0	0	90	0
Architectural Coatings	12	0	0	0	0	0	12	0
Others	~~3~~2	0	0	0	0	1	3	0
Misc. Processes[2]	~~12~~13	13	56	1	32	~~33~~35	~~6~~7	10
RECLAIM Sources[3]	0	15	0	6	0	0	0	15
Total Stationary Sources	**222**	**~~53~~52**	**~~113~~112**	**10**	**~~49~~48**	**60**	**220**	**~~51~~50**
MOBILE SOURCES								
On-Road Vehicles	65	~~97~~94	~~476~~465	2	10	13	~~69~~68	~~91~~88
Off-Road Vehicles	73	~~116~~110	~~722~~721	~~5~~6	6	0	90~~1~~	~~123~~117
Total Mobile Sources	**~~139~~137**	**~~213~~204**	**~~1198~~1186**	**7**	**16**	**13**	**~~159~~158**	**~~214~~205**
TOTAL	**~~361~~359**	**~~266~~257**	**~~1312~~1298**	**17**	**~~65~~64**	**~~73~~72**	**379**	**~~264~~255**

[1] Values are rounded to nearest integer and may not sum due to rounding
[2] Includes entrained road dust
[3] Includes 2015 RECLAIM NOx shaves

TABLE 3.2-4D

Summary of Emissions By Major Source Category: 2025 Baseline (annual PM2.5 attainment year) Average Annual Day and Summer Planning (tons/day[1])

SOURCE CATEGORY	Annual Average						Summer Planning	
	VOC	NOx	CO	SOx	PM2.5	NH3	VOC	NOx
STATIONARY SOURCES								
Fuel Combustion	11	22	50	2	6	9	11	~~23~~22
Waste Disposal	16	2	1	1	0	~~8~~6	~~16~~18	3
Cleaning and Surface Coatings	47	0	0	0	2	0	49	0
Petroleum Production and Marketing	~~20~~19	0	5	0	2	0	20	0
Industrial Processes	13	0	1	0	8	9	14	0
Solvent Evaporation:								
Consumer Products	91	0	0	0	0	0	91	0
Architectural Coatings	12	0	0	0	0	0	12	0
Others	3	0	0	0	0	1	3	0
Misc. Processes[2]	~~12~~13	13	56	1	32	~~34~~35	~~6~~7	9
RECLAIM Sources[3]	0	15	0	6	0	0	0	15
Total Stationary Sources	**~~225~~224**	**52**	**~~114~~112**	**10**	**49**	**60**	**223**	**~~50~~49**
MOBILE SOURCES								
On-Road Vehicles	~~59~~58	~~88~~85	~~413~~403	2	10	12	~~62~~61	~~82~~79
Off-Road Vehicles	71	~~110~~104	~~732~~731	6	5	0	~~88~~87	~~116~~110
Total Mobile Sources	**~~131~~129**	**~~197~~189**	**~~1145~~1134**	**7**	**~~16~~15**	**12**	**~~150~~148**	**~~198~~190**
TOTAL	**~~356~~353**	**~~250~~241**	**~~1259~~1247**	**17**	**~~65~~64**	**~~73~~72**	**~~373~~372**	**~~249~~239**

[1] Values are rounded to nearest integer and may not sum due to rounding
[2] Includes entrained road dust
[3] Includes 2015 RECLAIM NOx shaves

TABLE 3.2-4E

Summary of Emissions By Major Source Category: 2031 Baseline (2008 8-hr ozone attainment year) Average Annual Day and Summer Planning (tons/day[1])

SOURCE CATEGORY	Annual Average						Summer Planning	
	VOC	NOx	CO	SOx	PM2.5	NH3	VOC	NOx
STATIONARY SOURCES								
Fuel Combustion	11	~~23~~22	51	2	6	9	11	~~23~~22
Waste Disposal	~~17~~16	2	1	1	0	~~8~~6	~~17~~19	3
Cleaning and Surface ngs	50	0	0	0	2	1	52	0
Petroleum Production and Marketing	~~19~~18	0	5	0	2	0	~~19~~18	0
Industrial Processes	13	0	1	0	8	9	14	0
Solvent Evaporation								
Consumer Products	94	0	0	0	0	0	94	0
Architectural ngs	13	0	0	0	0	0	13	0
Others	3	0	0	0	0	1	3	0
Misc. Processes[2]	~~12~~13	11	56	1	33	~~35~~36	~~6~~7	9
RECLAIM Sources[3]	0	15	0	6	0	0	0	15
Total Stationary Sources	**~~232~~231**	**51**	**~~115~~113**	**10**	**~~51~~50**	**~~62~~61**	**~~230~~231**	**50**
MOBILE SOURCES								
On-Road Vehicles	~~48~~47	~~72~~69	~~316~~309	1	10	12	~~50~~49	~~68~~65
Off-Road Vehicles	~~68~~66	~~100~~94	~~768~~766	~~6~~7	5	0	~~82~~81	~~105~~100
Total Mobile Sources	**~~115~~114**	**~~172~~163**	**~~1084~~1074**	**8**	**15**	**12**	**~~132~~130**	**~~173~~165**
TOTAL	**~~347~~345**	**~~223~~214**	**~~1199~~1188**	**18**	**~~66~~65**	**73**	**362**	**~~223~~214**

[1] Values may not sum due to rounding
[2] Includes entrained road dust
[3] Includes 2015 RECLAIM NOx shaves

Figure 3.2-6 shows the fraction of the 2031 inventory by responsible agency for VOC, NOx, SOx, and directly emitted PM2.5. In 2031, a larger fraction of the NOx and VOC emissions will fall under SCAQMD control. However, the majority of VOC and NOx emissions will remain primarily under CARB and U.S. EPA jurisdiction. The fraction of SOx emissions that fall under SCAQMD control will remain largely unchanged from the 2012 base-year inventory. However, the increasing contribution of area and point sources towards direct PM2.5 emissions in 2031 will result in a larger fraction of emissions falling under SCAQMD control.

FIGURE 3.2-5 <u>(REVISED)</u>
Relative Contribution by Source Category to 2031 Emission Inventory.
(VOC & NOx – Summer Planning; CO, SOx, & PM2.5 – Annual Average Inventory)

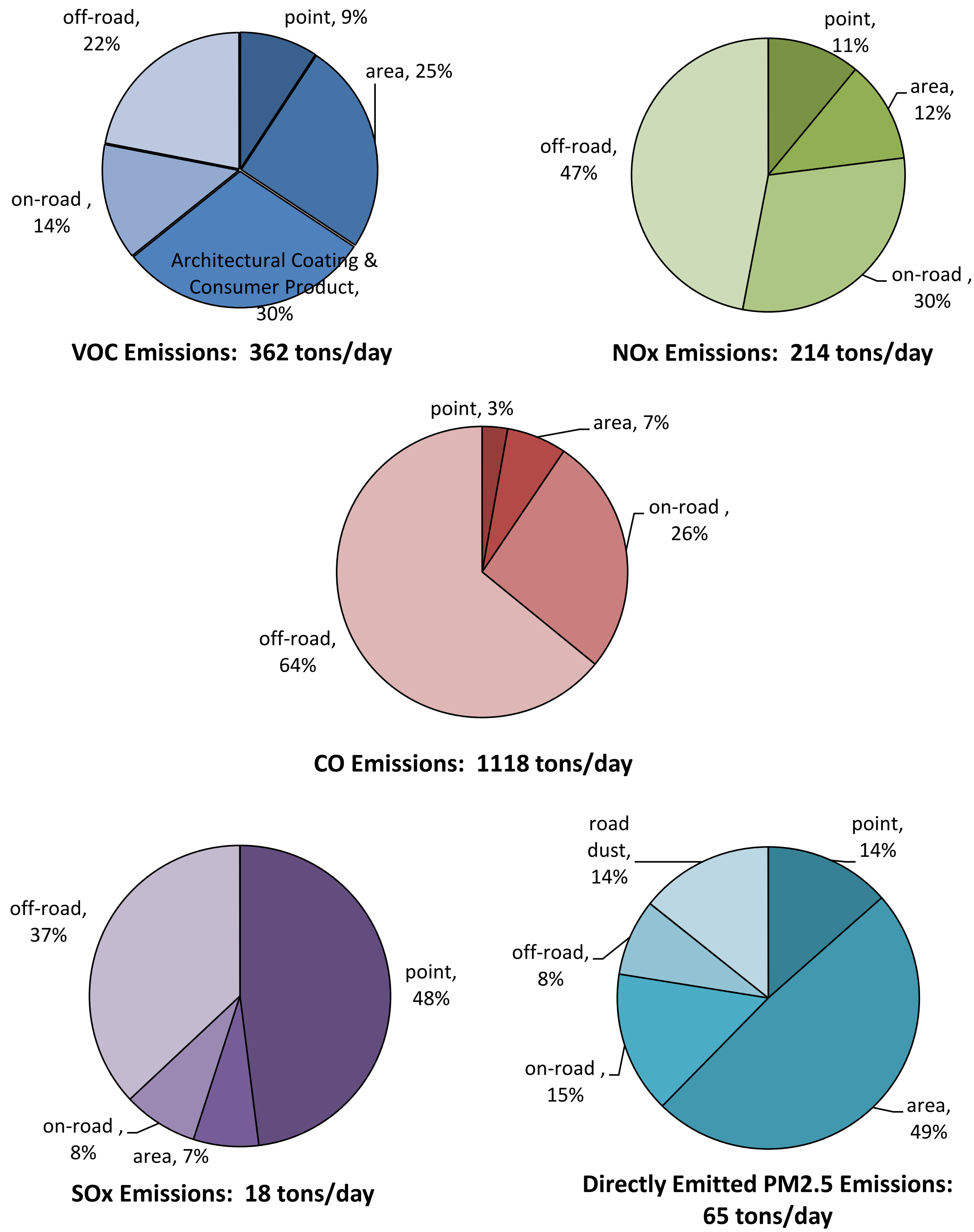
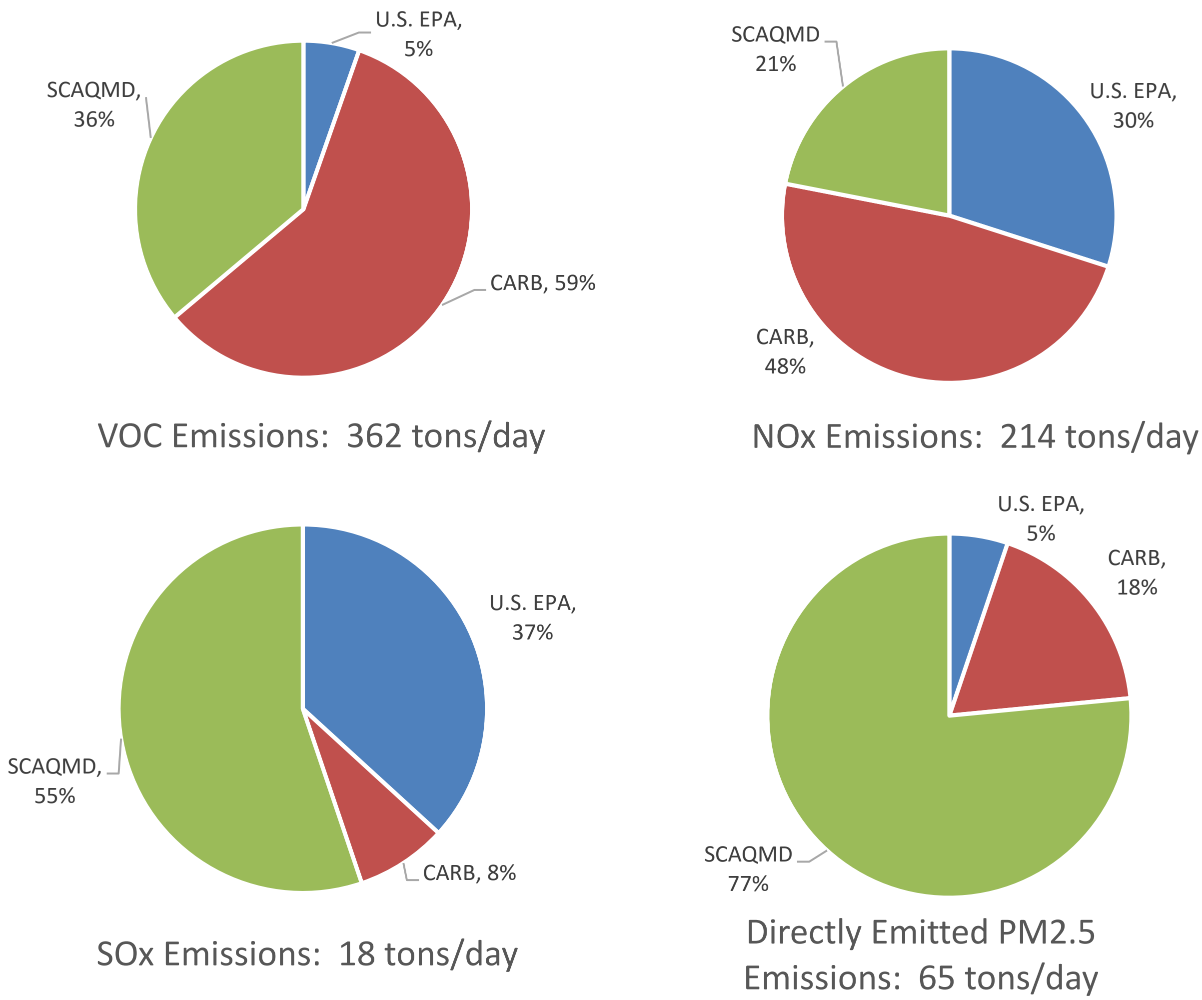


FIGURE 3.2-6 <u>(REVISED)</u>

2031 Emission Inventory Agency Responsibility
(VOC & NOx – Summer Planning; SOx, & PM2.5 – Annual Average Inventory)



(Taken from 2016 AQMP – Chapter 3)

3.2.1.4 Air Quality Monitoring

This section provides an overview of air quality in the Basin. A more detailed discussion of current and projected future air quality in the Basin, with and without additional control measures can be found in the 2016 AQMP (Chapter 3).

It is the responsibility of SCAQMD to ensure that state and federal ambient air quality standards are achieved and maintained in its geographical jurisdiction. Health-based air quality standards have been established by California and the federal government for the following criteria air pollutants: ozone, CO, NO2, PM10, PM2.5 SO2 and lead. These standards were established to protect sensitive receptors with a margin of safety from adverse health impacts due to exposure to air pollution. The California standards are more stringent than the federal standards and in the case of PM10 and SO2, far more stringent. California has also established standards for sulfates, visibility reducing particles, hydrogen sulfide, and vinyl chloride. The state and national ambient air quality standards for each of these pollutants and their effects on health are summarized in Table 3.2-5. SCAQMD monitors levels of various criteria pollutants at 34 monitoring stations. The 2015 air quality data (the latest data available) from SCAQMD's monitoring stations are presented in Table 3.2-6.

TABLE 3.2-5

State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	State Standard[a]	Federal Primary Standard[b]	Most Relevant Effects
Ozone (O_3)	1-hour	0.09 ppm (180 µg/m3)	No Federal Standard	(a) Short-term exposures: 1) Pulmonary function decrements and localized lung edema in humans and animals; and, 2) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (b) Long-term exposures: Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (c) Vegetation damage; and, (d) Property damage.
	8-hour	0.070 ppm (137 µg/m3)	0.075 ppm (147 µg/m3)	
Suspended Particulate Matter (PM10)	24-hour	50 µg/m3	150 µg/m3	(a) Excess deaths from short-term exposures and exacerbation of symptoms in sensitive patients with respiratory disease; and (b) Excess seasonal declines in pulmonary function, especially in children.
	Annual Arithmetic Mean	20 µg/m3	No Federal Standard	
Suspended Particulate Matter (PM2.5)	24-hour	No State Standard	35 µg/m3	(a) Increased hospital admissions and emergency room visits for heart and lung disease; (b) Increased respiratory symptoms and disease; and (c) Decreased lung functions and premature death.
	Annual Arithmetic Mean	12 µg/m3	12.0 µg/m3	
Carbon Monoxide (CO)	1-Hour	20 ppm (23 mg/m3)	35 ppm (40 mg/m3)	(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Impairment of central nervous system functions; and, (d) Possible increased risk to fetuses.
	8-Hour	9 ppm (10 mg/m3)	9 ppm (10 mg/m3)	

TABLE 3.2-5 (Concluded)

State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	State Standard[a]	Federal Primary Standard[b]	Most Relevant Effects
Nitrogen Dioxide (NO_2)	1-Hour	0.18 ppm (339 µg/m3)	0.100 ppm (188 µg/m3)	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; and, (c) Contribution to atmospheric discoloration.
	Annual Arithmetic Mean	0.030 ppm (57 µg/m3)	0.053 ppm (100 µg/m3)	
Sulfur Dioxide (SO_2)	1-Hour	0.25 ppm (655 µg/m3)	75 ppb (196 µg/m3)–	Broncho-constriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma.
	24-Hour	0.04 ppm (105 µg/m3)	No Federal Standard	
Sulfates	24-Hour	25 µg/m3	No Federal Standard	(a) Decrease in ventilatory function; (b) Aggravation of asthmatic symptoms; (c) Aggravation of cardio-pulmonary disease; (d) Vegetation damage; (e) Degradation of visibility; and, (f) Property damage
Hydrogen Sulfide (H_2S)	1-Hour	0.03 ppm (42 µg/m3)	No Federal Standard	Odor annoyance.
Lead (Pb)	30-Day Average	1.5 µg/m3	No Federal Standard	(a) Increased body burden; and (b) Impairment of blood formation and nerve conduction.
	Calendar Quarter	No State Standard	1.5 µg/m3	
	Rolling 3-Month Average	No State Standard	0.15 µg/m3	
Visibility Reducing Particles	8-Hour	Extinction coefficient of 0.23 per kilometer - visibility of ten miles or more due to particles when relative humidity is less than 70 percent.	No Federal Standard	The statewide standard is intended to limit the frequency and severity of visibility impairment due to regional haze. This is a visibility based standard not a health based standard. Nephelometry and AISI Tape Sampler; instrumental measurement on days when relative humidity is less than 70 percent.
Vinyl Chloride	24-Hour	0.01 ppm (26 µg/m3)	No Federal Standard	Highly toxic and a known carcinogen that causes a rare cancer of the liver.

a. The California ambient air quality standards for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, PM_{10}, and $PM_{2.5}$ are values not to be exceeded. All other California standards shown are values not to be equaled or exceeded.

b. The national ambient air quality standards, other than O_3 and those based on annual averages are not to be exceeded more than once a year. The O_3 standard is attained when the expected number of days per calendar year with maximum hourly average concentrations abpve the standards is equal to or less than one.

KEY: ppb = parts per billion parts of air, by volume; ppm = parts per million parts of air, by volume; µg/m3 = micrograms per cubic meter; mg/ m3 = milligrams per cubic meter

TABLE 3.2-6

2015 Air Quality Data – South Coast Air Quality Management District

CARBON MONOXIDE (CO)[a]				
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. ppm, 1-hour	Max.Conc.8ppm, 8-hour
LOS ANGELES COUNTY				
1	Central Los Angeles	365	3.2	1.8
2	Northwest Coastal Los Angeles County	365	1.6	1.4
3	Southwest Coastal Los Angeles County	357	1.7	1.4
4	South Coastal Los Angeles County 1	--	--	--
4	South Coastal Los Angeles County 2	--	--	--
4	South Coastal Los Angeles County 3	364	3.3	2.2
6	West San Fernando Valley	365	3.0	2.5
8	West San Gabriel Valley	365	2.6	1.6
9	East San Gabriel Valley 1	352	2.1	1.3
9	East San Gabriel Valley 2	363	1.2	1.0
10	Pomona/Walnut Valley	346	1.8	1.6
11	South San Gabriel Valley	365	2.8	1.7
12	South Central Los Angeles County	363	4.4	3.3
13	Santa Clarita Valley	359	1.2	0.9
ORANGE COUNTY				
16	North Orange County	365	3.0	1.6
17	Central Orange County	365	3.1	2.2
18	North Coastal Orange County	365	3.0	2.2
19	Saddleback Valley	364	1.4	0.7
RIVERSIDE COUNTY				
22	Norco/Corona	--	--	--
23	Metropolitan Riverside County 1	364	2.5	1.7
23	Mira Loma	362	2.3	1.6
24	Perris Valley	--	--	--
25	Lake Elsinore	364	0.8	0.6
26	Temecula	--	--	--
29	Banning Airport	--	--	--
30	Coachella Valley 1**	365	2.0	0.7
30	Coachella Valley 2**	--	--	--
SAN BERNARDINO COUNTY				
32	Northwest San Bernardino Valley	364	2.1	1.3
34	Central San Bernardino Valley 1	358	2.8	1.2
34	Central San Bernardino Valley 2	362	2.3	1.8
35	East San Bernardino Valley	--	--	--
37	Central San Bernardino Mountains	--	--	--
38	East San Bernardino Mountains	--	--	--
SCAQMD MAXIMUM			4.4	3.3
SOUTH COAST AIR BASIN			4.4	3.3

KEY: ppm = parts per million -- = Pollutant not monitored ** Salton Sea Air Basin

[a] The federal 8-hour standard (8-hour average CO > 9 ppm) and state 8-hour standard (8-hour average CO > 9.0 ppm) were not exceeded. The federal and state 1-hour standards (35 ppm and 20 ppm) were not exceeded either.

TABLE 3.2-6 (Continued)

2015 Air Quality Data – South Coast Air Quality Management District

OZONE (O3)										
						No. Days Standard Exceeded				
						Federal			State	
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. in ppm 1-hr	Max. Conc. in ppm 8-hr	4th High Conc. ppm 8-hr	Old > 0.124 ppm 1-hr	1997 > 0.084 ppm 8-hr	Current >0.075 ppm 8-hr*	Current > 0.09 ppm 1-hr	Current > 0.070 ppm 8-hr
LOS ANGELES COUNTY										
1	Central Los Angeles	365	0.104	0.074	0.072	0	6	0	2	6
2	Northwest Coastal Los Angeles County	353	0.102	0.072	0.069	0	2	0	2	3
3	Southwest Coastal Los Angeles County	365	0.096	0.077	0.069	0	3	1	1	3
4	South Coastal Los Angeles County 1	--	--	--	--	--	--	--	--	--
4	South Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--
4	South Coastal Los Angeles County 3	364	0.087	0.066	0.056	0	0	0	0	0
6	West San Fernando Valley	365	0.119	0.094	0.087	0	32	15	11	34
8	West San Gabriel Valley	361	0.111	0.084	0.082	0	18	7	12	18
9	East San Gabriel Valley 1	352	0.122	0.096	0.088	0	27	17	21	28
9	East San Gabriel Valley 2	362	0.127	0.102	0.095	2	48	34	37	51
10	Pomona/Walnut Valley	347	0.136	0.098	0.094	2	53	36	30	55
11	South San Gabriel Valley	346	0.107	0.081	0.075	0	11	2	6	11
12	South Central Los Angeles County	361	0.091	0.072	0.065	0	1	0	0	1
13	Santa Clarita Valley	358	0.126	0.108	0.091	1	52	37	23	55
ORANGE COUNTY										
16	North Orange County	365	0.103	0.082	0.073	0	7	2	4	8
17	Central Orange County	365	0.100	0.080	0.065	0	1	1	1	1
18	North Coastal Orange County	364	0.099	0.079	0.068	0	2	1	1	2
19	Saddleback Valley	358	0.099	0.088	0.075	0	8	3	2	8
RIVERSIDE COUNTY										
22	Norco/Corona	--	--	--	--	--	--	--	--	--
23	Metropolitan Riverside County 1	361	0.132	0.105	0.096	1	55	39	31	59
23	Mira Loma	356	0.127	0.104	0.093	1	51	36	29	51
24	Perris Valley	365	0.124	0.102	0.094	0	49	31	25	50
25	Lake Elsinore	362	0.131	0.098	0.093	1	31	19	18	35
26	Temecula	365	0.100	0.087	0.079	0	20	6	1	23

29	Banning Airport	359	0.124	0.097	0.091	0	46	25	16	49
30	Coachella Valley 1**	365	0.102	0.092	0.086	0	47	26	3	51
30	Coachella Valley 2**	287	0.093	0.085	0.079	0	11	4	0	12
SAN BERNARDINO COUNTY										
32	Northwest San Bernardino Valley	364	0.136	0.106	0.101	2	66	53	49	69
34	Central San Bernardino Valley 1	358	0.133	0.111	0.100	3	57	39	36	59
34	Central San Bernardino Valley 2	356	0.134	0.117	0.105	6	78	57	52	79
35	East San Bernardino Valley	329	0.137	0.115	0.102	2	76	54	44	77
37	Central San Bernardino Mountains	365	0.144	0.127	0.107	3	86	61	46	86
38	East San Bernardino Mountains	--	--	--	--	--	--	--	--	--
	SCAQMD MAXIMUM		0.144	0.127	0.107	6	86	61	52	86
	SOUTH COAST AIR BASIN		0.144	0.127	0.107	10	113	81	71	115

KEY:

ppm = parts per million -- = Pollutant not monitored ** Salton Sea Air Basin

- = Incomplete data

TABLE 3.2-6 (Continued)

2015 Air Quality Data – South Coast Air Quality Management District

NITROGEN DIOXIDE (NO2)[b]					
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	1-hour Max. Conc. ppb, 1,	1-hour 98th Percentile Conc. ppb,	Annual Average AAM Conc. ppb
LOS ANGELES COUNTY					
1	Central Los Angeles	365	79.1	62.4	22.2
2	Northwest Coastal Los Angeles County	365	67.6	49.4	11.7
3	Southwest Coastal Los Angeles County	365	87.0	58.1	10.9
4	South Coastal Los Angeles County 1	--	--	--	--
4	South Coastal Los Angeles County 2	--	--	--	--
4	South Coastal Los Angeles County 3	353	101.8	64.4	19.8
6	West San Fernando Valley	354	72.5	51.7	13.5
8	West San Gabriel Valley	365	74.9	55.9	15.3
9	East San Gabriel Valley 1	351	71.0	58.5	15.4
9	East San Gabriel Valley 2	365	66.2	52.6	11.2
10	Pomona/Walnut Valley	346	72.3	60.3	21.2
11	South San Gabriel Valley	345	70.4	61.6	20.5
12	South Central Los Angeles County	363	73.6	58.7	16.9
13	Santa Clarita Valley	360	64.6	43.5	11.8
ORANGE COUNTY					
16	North Orange County	334	58.0	50.8	15.0
17	Central Orange County	365	59.1	54.6	14.6
18	North Coastal Orange County	357	52.4	47.9	11.6
19	Saddleback Valley	--	--	--	--
RIVERSIDE COUNTY					
22	Norco/Corona	--	--	--	--
23	Metropolitan Riverside County 1	361	57.4	52.3	14.4
23	Mira Loma	362	68.1	49.2	13.4
24	Perris Valley	--	--	--	--
25	Lake Elsinore	357	47.2	38.8	8.7
26	Temecula	--	--	--	--
29	Banning Airport	365	49.6	44.3	8.4
30	Coachella Valley 1**	365	41.5	37.7	6.2
30	Coachella Valley 2**	--	--	--	--
SAN BERNARDINO COUNTY					
32	Northwest San Bernardino Valley	359	71.6	55.7	15.9
34	Central San Bernardino Valley 1	358	89.1	66.1	18.7
34	Central San Bernardino Valley 2	362	71.4	52.7	15.2
35	East San Bernardino Valley	--	--	--	--
37	Central San Bernardino Mountains	--	--	--	--
38	East San Bernardino Mountains	--	--	--	--
SCAQMD MAXIMUM			101.8	66.1	22.2
SOUTH COAST AIR BASIN			101.8	66.1	22.2

KEY:

ppb = parts per billion AAM = Annual Arithmetic Mean -- = Pollutant not monitored ** Salton Sea Air Basin

b The NO2 federal 1-hour standard is 100 ppb and the annual standard is annual arithmetic mean NO2 > 0.0534 ppm (53.4 ppb). The state 1-hour and annual standards are 0.18 ppm (180 ppb) and 0.030 ppm (30 ppb).

TABLE 3.2-6 (Continued)

2015 Air Quality Data – South Coast Air Quality Management District

SULFUR DIOXIDE (SO_2)[c]				
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Maximum Conc. ppb, 1-hour	99th Percentile Conc. ppb, 1-hour
LOS ANGELES COUNTY				
1	Central Los Angeles	364	12.6	6.3
2	Northwest Coastal Los Angeles County	--	--	--
3	Southwest Coastal Los Angeles County	358	14.9	6.8
4	South Coastal Los Angeles County 1	--	--	--
4	South Coastal Los Angeles County 2	--	--	--
4	South Coastal Los Angeles County 3	296	37.5	11.8
6	West San Fernando Valley	--	--	--
8	West San Gabriel Valley	--	--	--
9	East San Gabriel Valley 1	--	--	--
9	East San Gabriel Valley 2	--	--	--
10	Pomona/Walnut Valley	--	--	--
11	South San Gabriel Valley	--	--	--
12	South Central Los Angeles County	--	--	--
13	Santa Clarita Valley	--	--	--
ORANGE COUNTY				
16	North Orange County	--	--	--
17	Central Orange County	--	--	--
18	North Coastal Orange County	352	4.5	3.1
19	Saddleback Valley	--	--	--
RIVERSIDE COUNTY				
22	Norco/Corona	--	--	--
23	Metropolitan Riverside County 1	363	1.9	1.6
23	Mira Loma	--	--	--
24	Perris Valley	--	--	--
25	Lake Elsinore	--	--	--
26	Temecula	--	--	--
29	Banning Airport	--	--	--
30	Coachella Valley 1**	--	--	--
30	Coachella Valley 2**	--	--	--
SAN BERNARDINO COUNTY				
32	Northwest San Bernardino Valley	--	--	--
34	Central San Bernardino Valley 1	352	4.0	3.1
34	Central San Bernardino Valley 2	--	--	--
35	East San Bernardino Valley	--	--	--
37	Central San Bernardino Mountains	--	--	--
38	East San Bernardino Mountains	--	--	--
SCAQMD MAXIMUM		364	37.5	11.8
SOUTH COAST AIR BASIN		364	37.5	11.8

KEY:

ppb = parts per billion -- = Pollutant not monitored ** Salton Sea Air Basin

[c] The federal SO_2 1-hour standard is 75 ppb (0.075 ppm). The state standards are 1-hour average SO_2 > 0.25 ppm (250 ppb) and 24-hour average SO_2 > 0.04 ppm (40 ppb).

TABLE 3.2-6 (Continued)
2015 Air Quality Data – South Coast Air Quality Management District

SUSPENDED PARTICULATE MATTER PM10[d]						
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. $\mu g/m^3$, 24-hour	No. (%) Samples Exceeding Standard		Annual Average AAM Conc.[e)] $\mu g/m^3$
				Federal > 150 $\mu g/m^3$, 24-hour	State > 50 $\mu g/m^3$, 24-hour	
LOS ANGELES COUNTY						
1	Central Los Angeles	58	73	0	2	27.3
2	Northwest Coastal Los Angeles County	-	-	-	-	-
3	Southwest Coastal Los Angeles County	57	42	0	0	21.2
4	South Coastal Los Angeles County 1	-	-	-	-	-
4	South Coastal Los Angeles County 2	58	62	0	2	26.5
4	South Coastal Los Angeles County 3	59	80	0	6	31.5
6	West San Fernando Valley	-	-	-	-	-
8	West San Gabriel Valley	-	-	-	-	-
9	East San Gabriel Valley 1	59	101	0	12	37.1
9	East San Gabriel Valley 2	-	-	-	-	-
10	Pomona/Walnut Valley	-	-	-	-	-
11	South San Gabriel Valley	-	-	-	-	-
12	South Central Los Angeles County	-	-	-	-	-
13	Santa Clarita Valley	52	41	0	0	18.4
ORANGE COUNTY						
16	North Orange County	-	-	-	-	-
17	Central Orange County	56	59	0	2	25.4
18	North Coastal Orange County	-	-	-	-	-
19	Saddleback Valley	51	49	0	0	19.0
RIVERSIDE COUNTY						
22	Norco/Corona	44	87	0	3	29.6
23	Metropolitan Riverside County 1	114	69	0	9	31.7
23	Mira Loma	102	110	0	38	43.3
24	Perris Valley	57	74	0	3	30.3
25	Lake Elsinore	-	-	-	-	-
26	Temecula	-	-	-	-	-
29	Banning Airport	59	139	0	2	22.2
30	Coachella Valley 1**	55	33	0	0	16.7
30	Coachella Valley 2**	91	145	0	18	38.6
SAN BERNARDINO COUNTY						
32	Northwest San Bernardino Valley	-	-	-	-	-
34	Central San Bernardino Valley 1	55	96	0	13	37.8
34	Central San Bernardino Valley 2	57	78	0	3	29.9
35	East San Bernardino Valley	59	95	0	2	24.7
37	Central San Bernardino Mountains	58	41	0	0	16.1
38	East San Bernardino Mountains	-	-	-	-	-
	SCAQMD MAXIMUM		145+	0+	38+	43.3+
	SOUTH COAST AIR BASIN		139+	0+	49+	43.3+

KEY:

$\mu g/m^3$ = micrograms per cubic meter of air AAM = Annual Arithmetic Mean -- = Pollutant not monitored ** Salton Sea Air Basin

+ = High FRM and FEM PM10 data samples recorded at locations in Coachella Valley and the Basin are excluded due to the high wind in accordance with the U.S. EPA Exceptional Event Regulation.

d - Federal Reference Method (FRM) PM10 samples were collected every 6 days at all sites except for Stations 4144 and 4157, where samples were collected every 3 days. PM10 statistics listed above are for the FRM data only. Federal Equivalent Method (FEM) PM10 continuous monitoring instruments were operated at some of the above locations. Max 24-hour average PM10 at sites with FEM monitoring was 152 µg/m3, at Indio.

e - State standard is annual average (AAM) > 20 µg/m3. Federal annual PM10 standard (AAM > 50 µg/m3) was revoked in 2006.

TABLE 3.2-6 (Continued)

2015 Air Quality Data – South Coast Air Quality Management District

SUSPENDED PARTICULATE MATTER PM2.5 [f]						
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. $\mu g/m^3$, 24-hour	98^{th} Percentile Conc. in $\mu g/m^3$ 24-hr	No. (%) Samples Exceeding Federal Std > 35 $\mu g/m^3$, 24-hour	Annual Average AAM Conc.[g)] $\mu g/m^3$
LOS ANGELES COUNTY						
1	Central Los Angeles	342	56.4	38.0	7	12.38
2	Northwest Coastal Los Angeles County	-	-	-	-	-
3	Southwest Coastal Los Angeles County	-	-	-	-	-
4	South Coastal Los Angeles County 1	338	54.6	32.1	3	10.81
4	South Coastal Los Angeles County 2	347	48.3	31.2	4	10.26
4	South Coastal Los Angeles County 3	-	-	-	-	-
6	West San Fernando Valley	113	36.8	28.4	1	8.84
8	West San Gabriel Valley	119	48.5	32.4	2	9.85
9	East San Gabriel Valley 1	120	70.3	30.0	2	9.88
9	East San Gabriel Valley 2	-	-	-	-	-
10	Pomona/Walnut Valley	-	-	-	-	-
11	South San Gabriel Valley	118	52.7	41.8	3	11.52
12	South Central Los Angeles County	111	41.3	37.2	3	11.78
13	Santa Clarita Valley	-	-	-	-	-
ORANGE COUNTY						
16	North Orange County	-	-	-	-	-
17	Central Orange County	295	45.8	29.8	3	9.38
18	North Coastal Orange County	-	-	-	-	-
19	Saddleback Valley	115	31.5	15.1	0	7.05
RIVERSIDE COUNTY						
22	Norco/Corona	-	-	-	-	-
23	Metropolitan Riverside County 1	341	54.7	38.1	9	11.89
23	Mira Loma	343	56.6	43.2	17	13.34
24	Perris Valley	-	-	-	-	-
25	Lake Elsinore	-	-	-	-	-
26	Temecula	-	-	-	-	-
29	Banning Airport	-	-	-	-	-
30	Coachella Valley 1**	108	22.7	17.1	0	5.76
30	Coachella Valley 2**	94	24.6	19.7	0	7.54
SAN BERNARDINO COUNTY						
32	Northwest San Bernardino Valley	-	-	-	-	-
34	Central San Bernardino Valley 1	114	50.5	37.7	3	11.05
34	Central San Bernardino Valley 2	110	53.5	33.6	2	10.74
35	East San Bernardino Valley	-	-	-	-	-
37	Central San Bernardino Mountains	-	-	-	-	-
38	East San Bernardino Mountains	58	39.4	35.3	1	7.59
SCAQMD MAXIMUM			70.3	43.2	17	13.34
SOUTH COAST AIR BASIN			70.3	43.2	25**	13.34

KEY:

$\mu g/m^3$ = micrograms per cubic meter of air   AAM = Annual Arithmetic Mean   -- = Pollutant not monitored   ** Salton Sea Air Basin

f PM2.5 samples were collected every 3 days at all sites except for station numbers 072, 077, 087, 3176, 4144 and 4165, where samples were taken daily, and station number 5818 where samples were taken every 6 days. PM2.5 statistics listed above are for the FRM data only. FEM PM2.5 continuous monitoring instruments were operated at some of the above locations for special purposes studies. .

g Both federal and state standards are annual average (AAM) > 12.0 $\mu g/m^3$.

TABLE 3.2-6 (Concluded)

2015 Air Quality Data – South Coast Air Quality Management District

Source Receptor Area No.	Location of Air Monitoring Station	LEAD[h]		SULFATES (SOx)[i]	
		Max. Monthly Average Conc. [m)] $\mu g/m^3$	Max. 3-Month Rolling Average [m)] $\mu g/m^3$	No.. Days of Data	Max. Conc. $\mu g/m^3$, 24-hour
LOS ANGELES COUNTY					
1	Central Los Angeles	0.013	0.01	--	--
2	Northwest Coastal Los Angeles County	--	--	--	--
3	Southwest Coastal Los Angeles County	0.008	0.01	--	--
4	South Coastal Los Angeles County 1	--	--	--	--
4	South Coastal Los Angeles County 2	0.010	0.01	--	--
4	South Coastal Los Angeles County 3	--	--	--	--
6	West San Fernando Valley	--	--	--	--
8	West San Gabriel Valley	--	--	--	--
9	East San Gabriel Valley 1	--	--	--	--
9	East San Gabriel Valley 2	--	--	--	--
10	Pomona/Walnut Valley	--	--	--	--
11	South San Gabriel Valley	0.014	0.01	--	--
12	South Central Los Angeles County	0.014	0.01	--	--
13	Santa Clarita Valley	--	--	--	--
ORANGE COUNTY					
16	North Orange County	--	--	--	--
17	Central Orange County	--	--	--	--
18	North Coastal Orange County	--	--	--	--
19	Saddleback Valley	--	--	--	--
RIVERSIDE COUNTY					
22	Norco/Corona	--	--	--	--
23	Metropolitan Riverside County 1	0.008	0.01	--	--
23	Mira Loma	--	--	--	--
24	Perris Valley	--	--	--	--
25	Lake Elsinore	--	--	--	--
26	Temecula	--	--	--	--
29	Banning Airport	--	--	--	--
30	Coachella Valley 1**	--	--	--	--
30	Coachella Valley 2**	--	--	--	--
SAN BERNARDINO COUNTY					
32	Northwest San Bernardino Valley	0.010	0.01	--	--
34	Central San Bernardino Valley 1	--	--	--	--
34	Central San Bernardino Valley 2	0.012	0.01	--	--
35	East San Bernardino Valley	--	--	--	--
37	Central San Bernardino Mountains	--	--	--	--
38	East San Bernardino Mountains	--	--	--	--
SCAQMD MAXIMUM		0.014	0.010	--	--
SOUTH COAST AIR BASIN		0.014	0.010	--	--

KEY:

$\mu g/m^3$ = micrograms per cubic meter of air -- = Pollutant not monitored ** Salton Sea Air Basin

h Federal lead standard is 3-months rolling average > 0.15 $\mu g/m^3$; state standard is monthly average ≥ 1.5 $\mu g/m^3$. .Lead standards were not exceeded.

i Sulfate data is not available at this time. State sulfate standard is 24-hour □ 25 µg/m3. There is no federal standard for sulfate.

3.2.1.4.1 Carbon Monoxide

CO is a primary pollutant, meaning that it is directly emitted into the air, not formed in the atmosphere by chemical reaction of precursors, as is the case with ozone and other secondary pollutants. Ambient concentrations of CO in the Basin exhibit large spatial and temporal variations due to variations in the rate at which CO is emitted and in the meteorological conditions that govern transport and dilution. Unlike ozone, CO tends to reach high concentrations in the fall and winter months. The highest concentrations frequently occur on weekdays at times consistent with rush hour traffic and late night during the coolest, most stable portion of the day.

Individuals with a deficient blood supply to the heart are the most susceptible to the adverse effects of CO exposure. The effects observed include earlier onset of chest pain with exercise, and electrocardiograph changes indicative of worsening oxygen supply to the heart.

Inhaled CO has no direct toxic effect on the lungs, but exerts its effect on tissues by interfering with oxygen transport by competing with oxygen to combine with hemoglobin present in the blood to form carboxyhemoglobin (COHb). Hence, conditions with an increased demand for oxygen supply can be adversely affected by exposure to CO. Individuals most at risk include patients with diseases involving heart and blood vessels, fetuses, and patients with chronic hypoxemia (oxygen deficiency) as seen in high altitudes.

Reductions in birth weight and impaired neurobehavioral development have been observed in animals chronically exposed to CO resulting in COHb levels similar to those observed in smokers. Recent studies have found increased risks for adverse birth outcomes with exposure to elevated CO levels. These include preterm births and heart abnormalities.

CO concentrations were measured at 23 locations in the Basin and neighboring Salton Sea Air Basin areas in 2014. CO concentrations did not exceed the standards in 2014. The highest 1-hour average CO concentration recorded (4.4 ppm in the South Central Los Angeles County area) was 22 percent of the federal 1-hour CO standard of 20 ppm. The highest 8-hour average CO concentration recorded (3.3 ppm in the South Central Los Angeles County area) was 37 percent of the federal 8-hour CO standard of 9.0 ppm. The state 1-hour standard is also 9.0 ppm. The highest 8-hour average CO concentration is 17 percent of the state 8-hour CO standard of 20 ppm.

In 2004, SCAQMD formally requested the U.S. EPA to re-designate the Basin from nonattainment to attainment with the CO NAAQS. On February 24, 2007, U.S. EPA published in the Federal Register its proposed decision to re-designate the Basin from nonattainment to attainment for CO. The comment period on the re-designation proposal closed on March 16, 2007 with no comments received by the U.S. EPA. On May 11, 2007, U.S. EPA published in the Federal Register its final decision to approve SCAQMD's request for re-designation from non-attainment to attainment for CO, effective June 11, 2007.

On August 12, 2011 U.S. EPA issued a decision to retain the existing NAAQS for CO, determining that those standards provided the required level of public health protection. However, U.S. EPA added a monitoring requirement for near-road CO monitors in urban areas with population of one million or more, utilizing stations that would be implemented to meet the 2010 NO2 near-road monitoring requirements. The two new CO monitors are at the I-5 near-road site, located in Orange County near Anaheim, and the I-10 near-road site, located near Etiwanda Avenue in San Bernardino County near Ontario, Rancho Cucamonga and Fontana.

The near-road CO measurements began at these two locations in late December 2014. From that time to the end of 2015, the preliminary data shows that while the near-road measurements were often higher than the nearest ambient monitors, as would be expected in the near-road environment, they did not exceed the levels of the 1-hour or 8-hour CO NAAQS. The preliminary 2015 near-road peak 1-hour CO concentration measured was 2.6 ppm, measured at the I-10 near-road site, while the peak 8-hour CO concentration was 3.1 ppm at the I-5 near-road site, both well below the respective NAAQS levels (35 ppm and 9 ppm, respectively). Based on this limited period of data, it appears that the near-road CO design values will be unlikely to affect the Basin's attainment status for the state and federal CO standards.

3.2.1.4.2 Ozone

Ozone (O3), a colorless gas with a sharp odor, is a highly reactive form of oxygen. High ozone concentrations exist naturally in the stratosphere. Some mixing of stratospheric ozone downward through the troposphere to the earth's surface does occur; however, the extent of ozone transport is limited. At the earth's surface in sites remote from urban areas ozone concentrations are normally very low (e.g., from 0.03 ppm to 0.05 ppm).

The propensity of ozone for reacting with organic materials causes it to be damaging to living cells and ambient ozone concentrations in the Basin are frequently sufficient to cause health effects. Ozone enters the human body primarily through the respiratory tract and causes respiratory irritation and discomfort, makes breathing more difficult during exercise, and reduces the respiratory system's ability to remove inhaled particles and fight infection.

Individuals exercising outdoors, children and people with preexisting lung disease, such as asthma and chronic pulmonary lung disease, are considered to be the most susceptible subgroups for ozone effects. Short-term exposures (lasting for a few hours) to ozone at levels typically observed in Southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes. In recent years, a correlation between elevated ambient ozone levels and increases in daily hospital admission rates, as well as mortality, has also been reported. An increased risk for asthma has been found in children who participate in multiple sports and live in high ozone communities. Elevated ozone levels are also associated with increased school absences.

Ozone exposure under exercising conditions is known to increase the severity of the above mentioned observed responses. Animal studies suggest that exposures to a combination of pollutants which include ozone may be more toxic than exposure to ozone alone. Although lung volume and resistance changes observed after a single exposure diminish with repeated exposures, biochemical and cellular changes appear to persist, which can lead to subsequent lung structural changes.

In 2015, SCAQMD regularly monitored ozone concentrations at 29 locations in the Basin and the Coachella Valley portion of the Salton Sea Air Basin. Maximum ozone concentrations for all areas monitored were below the stage 1 episode level (0.20 ppm) and below the health advisory level (0.15 ppm) (see Table 3.2-6). All counties in the Basin, as well as the Coachella Valley, exceeded the level of the new 2015 (0.070 ppm), the former 2008 (0.075 ppm), and/or the 1997 (0.08 ppm) 8-hour ozone NAAQS in 2015. While not all stations had days exceeding the previous 8-hour standards, all monitoring stations had at least one day over the 2015 federal standard.

In 2015, the maximum ozone concentrations in the Basin continued to exceed federal standards by wide margins. Maximum 1-hour and 8-hour average ozone concentrations were 0.144 ppm and 0.107 ppm, respectively (the maximum 1-hour and 8-hour average was recorded in the Central San Bernardino Mountain area). The maximum 8-hour concentration of 0.127 ppm was 181 percent of the new federal standard. The maximum 1-hour concentration was 160 percent of the 1-hour state ozone standard of 0.09 ppm. The 8-hour average concentration was 160 percent of the 8-hour state ozone standard of 0.070 ppm.

The objective of the 2016 AQMP is to attain and maintain ambient air quality standards. Implementation of all control measures contained in the 2016 AQMP is anticipated to bring the Basin into compliance with the federal 8-hour ozone standard by 2023 and the state 8-hour ozone standard beyond 2032.

3.2.1.4.3 Nitrogen Dioxide

NO2 is a reddish-brown gas with a bleach-like odor. Nitric oxide (NO) is a colorless gas, formed from the nitrogen (N2) and oxygen (O2) in air under conditions of high temperature and pressure which are generally present during combustion of fuels; NO reacts rapidly with the oxygen in air to form NO2. NO2 is responsible for the brownish tinge of polluted air. The two gases, NO and NO2, are referred to collectively as NOx. In the presence of sunlight, NO2 reacts to form nitric oxide and an oxygen atom. The oxygen atom can react further to form ozone, via a complex series of chemical reactions involving hydrocarbons. Nitrogen dioxide may also react to form nitric acid (HNO3) which reacts further to form nitrates, components of PM2.5 and PM10.

Population-based studies suggest that an increase in acute respiratory illness, including infections and respiratory symptoms in children (not infants), is associated with long-term exposures to NO2 at levels found in homes with gas stoves, which are higher than ambient levels found in Southern California. Increase in resistance to air flow and airway contraction is observed after short-term exposure to NO2 in healthy subjects. Larger decreases in lung functions are observed in individuals with asthma and/or chronic obstructive pulmonary disease (e.g., chronic bronchitis, emphysema) than in healthy individuals, indicating a greater susceptibility of these subgroups. More recent studies have found associations between NO2 exposures and cardiopulmonary mortality, decreased lung function, respiratory symptoms and emergency room asthma visits.

In animals, exposure to levels of NO2 considerably higher than ambient concentrations results in increased susceptibility to infections, possibly due to the observed changes in cells involved in maintaining immune functions. The severity of lung tissue damage associated with high levels of ozone exposure increases when animals are exposed to a combination of ozone and NO2.

In 2015, nitrogen dioxide concentrations were monitored at 24 locations. No area of the Basin or Salton Sea Air Basin exceeded the federal or state standards for NO2. The Basin has not exceeded the federal standard for NO2 (0.0534 ppm) since 1991, when the Los Angeles County portion of the Basin recorded the last exceedance of the standard in any county within the United States. The current 1-hour average NO2 NAAQS (100 ppb) was last exceeded on two days in 2014 in the South Coastal Los Angeles County area at the Long Beach-Hudson air monitoring station. However, the 98th percentile form of the standard was not exceeded and the 2013-2015 design value is not in violation of the NAAQS. The higher relative concentrations in the Los Angeles area are indicative of the concentrated emission sources, especially heavy-duty vehicles. NOx emission reductions continue to be necessary because it is a precursor to both ozone and PM (PM2.5 and PM10) concentrations.

With the revised NO2 federal standard in 2010, near-road NO2 measurements were required to be phased in for larger cities. The four near-road monitoring stations are: (1) I-5 near-road, located in Orange County near Anaheim; (2) I-710 near-road, located at Long Beach Blvd. in Los Angeles County near Compton and Long Beach; (3) SR-60 near-road, located west of Vineyard Avenue near the San Bernardino/Riverside County border near Ontario, Mira Loma and Upland; and (4) I-10 near-road, located near Etiwanda Avenue in San Bernardino County near Ontario, Rancho Cucamonga and Fontana.

The longest operating near-road station in the Basin, adjacent to I-5 in Orange County, has not exceeded the level of the 1-hour NO2 NAAQS (100 ppb) since the measurements began on January 1, 2014. The peak 1-hour NO2 concentration at that site in 2014 was 78.8 ppb and the peak concentration for 2015 was 70.2 ppb. This can be compared to the annual peak values measured at the nearest ambient monitoring station in Central Orange County (Anaheim station), where the 2014 and 2015 peaks were 75.8 and 59.1, respectively. In terms of the design value form of the NAAQS, the 98th percentile daily maximum 1-hour concentrations at the Anaheim near-road site were 66.0 ppb and 61.4 ppb, respectively, for 2014 and 2015, compared to 59.8 ppb and 54.6 ppb from the Anaheim ambient monitoring station. The annual average NO2 NAAQS (0.053 ppm, or 53 ppb) was also not exceeded. Thus, while the Anaheim near-road NO2 measurements are higher than the ambient Orange County measurements, as would be expected close to traffic emissions sources, it does not appear that NO2 design values will violate the NAAQS or CAAQS at this location. Likewise, the shorter period of data available from the remaining three near-road stations indicates that these locations will also likely measure higher NO2 than the nearest ambient stations, but they have not exceeded the level of the 1-hour or annual NO2 NAAQS or CAAQS through the end of 2015. Based on this limited period of data, it appears that the near-road NO2 measurements will be unlikely to affect the Basin's attainment status for the state and federal NO2 standards.

3.2.1.4.4 Sulfur Dioxide

SO2 is a colorless gas with a sharp odor. It reacts in the air to form sulfuric acid (H2SO4), which contributes to acid precipitation, and sulfates, which are components of PM10 and PM2.5. Most of the SO2 emitted into the atmosphere is produced by burning sulfur-containing fuels.

Exposure of a few minutes to low levels of SO2 can result in airway constriction in some asthmatics. All asthmatics are sensitive to the effects of SO2. In asthmatics, increase in resistance to air flow, as well as reduction in breathing capacity leading to severe breathing difficulties, is observed after acute higher exposure to SO2. In contrast, healthy individuals do not exhibit similar acute responses even after exposure to higher concentrations of SO2.

Animal studies suggest that despite SO2 being a respiratory irritant, it does not cause substantial lung injury at ambient concentrations. However, very high levels of exposure can cause lung edema (fluid accumulation), lung tissue damage, and sloughing off of cells lining the respiratory tract.

Some population-based studies indicate that the mortality and morbidity effects associated with fine particles show a similar association with ambient SO2 levels. In these studies, efforts to separate the effects of SO2 from those of fine particles have not been successful. It is not clear whether the two pollutants act synergistically or one pollutant alone is the predominant factor.

No exceedances of federal or state standards for sulfur dioxide occurred in 2015 at any of the six locations monitored the Basin. The maximum 1-hour SO2 concentration was 37.5 ppb, as recorded in the South Coastal Los Angeles County area. The maximum 24-hour SO2 concentration was 11.8 ppb, as recorded in South Coastal Los Angeles County area. Though SO2 concentrations remain well below the standards, SO2 is a precursor to sulfate, which is a component of fine particulate matter, PM10, and PM2.5. Historical measurements showed concentrations to be well below standards and monitoring has been discontinued.

3.2.1.4.5 Particulate Matter (PM10 and PM2.5)

Of great concern to public health are the particles small enough to be inhaled into the deepest parts of the lung. Respirable particles (particulate matter less than about 10 micrometers in diameter (PM10)) can accumulate in the respiratory system and aggravate health problems such as asthma, bronchitis and other lung diseases. Children, the elderly, exercising adults, and those suffering from asthma are especially vulnerable to adverse health effects of PM10 and PM2.5.

A consistent correlation between elevated ambient fine particulate matter (PM2.5) levels and an increase in mortality rates, respiratory infections, number and severity of asthma attacks and the number of hospital admissions has been observed in different parts of the United States and various areas around the world. Studies have reported an association between long-term exposure to air pollution dominated by PM2.5 and increased mortality, reduction in life-span, and an increased mortality from lung cancer.

Daily fluctuations in fine particulate matter concentration levels have also been related to hospital admissions for acute respiratory conditions, to school and kindergarten absences, to a decrease in respiratory function in normal children and to increased medication use in children and adults with asthma. Studies have also shown lung function growth in children is reduced with long-term exposure to particulate matter. In addition to children, the elderly, and people with preexisting respiratory and/or cardiovascular disease appear to be more susceptible to the effects of PM10 and PM2.5.

SCAQMD monitored PM10 concentrations at 19 locations in 2015. The federal 24-hour PM10 standard (150 µg/m^3) was not exceeded in 2015. The Basin has remained in attainment of the PM10 NAAQS since 2006. The maximum three-year average 24-hour PM10 concentration of 145 µg/m^3 was recorded in the Coachella Valley area and was 97 percent of the federal standard and 290 percent of the much more stringent state 24-hour PM10 standard (50 µg/m3). The state 24-hour PM10 standard was exceeded at several of the monitoring stations. The maximum annual average PM10 concentration of 43.3 µg/m^3 was recorded in the Mira Loma area. The latest three-year annual average PM10 concentration of 44.1 µg/m^3 was recorded in the San Gabriel Valley (based on 2012 through 2014 monitoring data). The federal annual PM10 standard has been revoked. The much more stringent state annual PM10 standard (20 µg/m^3) was exceeded in most stations in each county in the Basin and in the Coachella Valley.

In 2015, PM2.5 concentrations were monitored at 17 locations throughout the Basin. U.S. EPA revised the federal 24-hour PM2.5 standard from 65 µg/m3 to 35 µg/m^3, effective December 17, 2006. In 2015, the maximum PM2.5 concentrations in the Basin exceeded the new federal 24-hour PM2.5 standard in all but three locations. The maximum 24-hour PM2.5 concentration of 70.3 µg/m^3 was recorded in the East San Gabriel Valley area. The 98^{th} percentile 24-hour PM2.5 concentration of 43.2 µg/m^3 was recorded in the Mira Loma area, which exceeds the federal standard of 35 µg/m3. The maximum annual average concentration of 13.34 µg/m^3 was recorded in Mira Loma, which represents 89 percent of the 2006 federal standard of 15 µg/m^3. The 3-year high state annual average PM2.5 concentration of 19 µg/m^3 was recorded in Metropolitan Riverside County (based on 2013 through 2015 monitoring), which represents 158 percent of the state standard of 12 µg/m^3.

On December 14, 2012, U.S. EPA strengthened the annual NAAQS for PM2.5 to 12 µg/m^3 and, as part of the revisions, a requirement was added to monitor near the most heavily trafficked roadways in large urban areas. Particle pollution is expected to be higher along these roadways as a result of direct emissions from cars and heavy-duty diesel trucks and buses. SCAQMD has installed the two required PM2.5 monitors by January 1, 2015, at locations selected based upon the existing near-roadway NO2 sites that were ranked higher for heavy-duty diesel traffic. The locations are: (1) I-710, located at Long Beach Blvd. in Los Angeles County near Compton and Long Beach; and (2) SR-60, located west of Vineyard Avenue near the San Bernardino/Riverside County border near Ontario, Mira Loma and Upland. These near-road sites measure PM2.5 daily with FRM filter-based measurements.

The preliminary 2015 PM2.5 annual averages from the I-710 and SR-60 Near-road sites were 12.89 and 14.48 µg/m^3, respectively. The nearby ambient stations in South Coastal Los Angeles County (North Long Beach Station) and in Metropolitan Riverside County (Mira Loma station) measured 12.81 and 13.34 µg/m3, respectively, for the preliminary 2015 annual average. Thus, the preliminary PM2.5 measurements from these sites for 2015 indicate that the near-road sites do indeed measure higher than the nearby ambient stations, on average. If this pattern holds for the long term, the SR-60 near-road station could potentially become the three-year design value site for the Basin for the PM2.5 annual average NAAQS, once sufficient data is collected.

While it reasonably could be expected that the highest near-road site would also become the Basin-maximum design value site for the 24-hour PM2.5 NAAQS, this may not be the case for the Basin.

The 2015 98th percentile 24-hour PM2.5 concentration is higher at the I-710 near-road than at the nearby North Long Beach station. However, the 98th percentile 24-hour concentration remains higher at Mira Loma (43.2 $\mu g/m^3$) than at the SR-60 Near-road site (39.9 $\mu g/m^3$). The number of days over the 24-hour PM2.5 NAAQS was also significantly higher at the Mira Loma station, with 17 days over the 24-hour NAAQS compared to 10 days at the SR-60 near-road site. PM2.5 24-hour concentrations at the Mira Loma station are likely higher than the near-road site on the highest days, due to the influence of enhanced secondary particle formation at Mira Loma.

The 2016 AQMP demonstrates how the region will achieve the 2012 annual PM2.5 (12.0 $\mu g/m^3$) as expeditiously as practicable, but no later than the statutory attainment deadline of 2025.

3.2.1.4.6 Lead

Lead in the atmosphere is present as a mixture of a number of lead compounds. Leaded gasoline and lead smelters have been the main sources of lead emitted into the air. Due to the phasing out of leaded gasoline, there was a dramatic reduction in atmospheric lead in the Basin over the past three decades.

Fetuses, infants, and children are more sensitive than others to the adverse effects of lead exposure. Exposure to low levels of lead can adversely affect the development and function of the central nervous system, leading to learning disorders, distractibility, inability to follow simple commands, and lower intelligence quotient. In adults, increased lead levels are associated with increased blood pressure.

Lead poisoning can cause anemia, lethargy, seizures, and death. It appears that there are no direct effects of lead on the respiratory system. Lead can be stored in the bone from early-age environmental exposure, and elevated blood lead levels can occur due to breakdown of bone tissue during pregnancy, hyperthyroidism (increased secretion of hormones from the thyroid gland), and osteoporosis (breakdown of bone tissue). Fetuses and breast-fed babies can be exposed to higher levels of lead because of previous environmental lead exposure of their mothers.

The state standards for lead were not exceeded in any area of the SCAQMD in 2015. There have been no violations of these standards at SCAQMD's regular air monitoring stations since 1982, as a result of removal of lead from gasoline. However, monitoring at two stations immediately adjacent to stationary sources of lead recorded exceedances of the standard in Los Angeles County over the 2007-2009 time period. These data were used for designations under the revised standard that also included new requirements for near-source monitoring. As a result, a nonattainment designation was finalized for much of the Los Angeles County portion of the Basin when the current standard was implemented.

The current lead concentrations in Los Angeles County are now below the NAAQS. The maximum quarterly average lead concentration (0.01 $\mu g/m^3$ at several monitoring) was seven percent of the federal quarterly average lead standard (0.15 $\mu g/m^3$). The maximum monthly average lead concentration (0.014 $\mu g/m^3$ in South San Gabriel and South Central Los Angeles County) was one percent of the state monthly average lead standard. As a result of the 2012-2014 design value below the NAAQS, SCAQMD will be requesting that U.S. EPA re-designate the nonattainment area as attaining the federal lead standard. Stringent SCAQMD rules governing lead-producing sources will help to ensure that there are no future violations of the federal standard. Furthermore, one business that had been responsible for the highest measured lead concentrations in Los Angeles County has closed and is in the process of demolition and site clean-up.

3.2.1.4.7 Sulfates

Sulfates are chemical compounds which contain the sulfate ion and are part of the mixture of solid materials which make up PM10. Most of the sulfates in the atmosphere are produced by oxidation of SO2. Oxidation of sulfur dioxide yields sulfur trioxide (SO_3) which reacts with water to form sulfuric acid, which contributes to acid deposition. The reaction of sulfuric acid with basic substances such as ammonia yields sulfates, a component of PM10 and PM2.5.

Most of the health effects associated with fine particles and SO2 at ambient levels are also associated with sulfates. Thus, both mortality and morbidity effects have been observed with an increase in ambient sulfate concentrations. However, efforts to separate the effects of sulfates from the effects of other pollutants have generally not been successful.

Clinical studies of asthmatics exposed to sulfuric acid suggest that adolescent asthmatics are possibly a subgroup susceptible to acid aerosol exposure. Animal studies suggest that acidic particles such as sulfuric acid aerosol and ammonium bisulfate are more toxic than nonacidic particles like ammonium sulfate. Whether the effects are attributable to acidity or to particles remains unresolved.

The most current data available for sulfates is for 2014. In 2014, the state 24-hour sulfate standard (25 $\mu g/m^3$) was not exceeded in any of the 20 monitoring locations in the Basin. The maximum 24-hour sulfate concentration was 14.3 ppb, as recorded in the Central Los Angeles County area. There are no federal sulfate standards.

3.2.1.4.8 Vinyl Chloride

Vinyl chloride is a colorless, flammable gas at ambient temperature and pressure. It is also highly toxic and is classified by the American Conference of Governmental Industrial Hygienists (ACGIH) as A1 (confirmed carcinogen in humans) and by the International Agency for Research on Cancer (IARC) as 1 (known to be a human carcinogen) (Air Gas, 2010). At room temperature, vinyl chloride is a gas with a sickly sweet odor that is easily condensed. However, it is stored as a liquid. Due to the hazardous nature of vinyl chloride to human health there are no end products that use vinyl chloride in its monomer form. Vinyl chloride is a chemical intermediate, not a final product. It is an important industrial chemical chiefly used to produce polymer polyvinyl chloride (PVC). The process involves vinyl chloride liquid fed to polymerization reactors where it is converted from a monomer to a polymer PVC. The final product of the polymerization process is PVC in either a flake or pellet form. Billions of pounds of PVC are sold on the global market each year. From its flake or pellet form, PVC is sold to companies that heat and mold the PVC into end products such as PVC pipe and bottles.

In the past, vinyl chloride emissions have been associated primarily with sources such as landfills. Risks from exposure to vinyl chloride are considered to be a localized impacts rather than regional impacts. Because landfills in the SCAQMD are subject to Rule 1150.1 – Control of Gaseous Emissions from Municipal Solid Waste Landfills, which contains stringent requirements for landfill gas collection and control, potential vinyl chloride emissions are expected to be below the level of detection. Therefore, SCAQMD does not monitor for vinyl chloride at its monitoring stations.

3.2.1.4.9 Volatile Organic Compounds

It should be noted that there are no state or national ambient air quality standards for VOCs because they are not classified as criteria pollutants. VOCs are regulated, however, because limiting VOC emissions reduces the rate of photochemical reactions that contribute to the formation of ozone. VOCs are also transformed into organic aerosols in the atmosphere, contributing to higher PM10 and lower visibility levels.

Although health-based standards have not been established for VOCs, health effects can occur from exposures to high concentrations of VOCs because of interference with oxygen uptake. In general, ambient VOC concentrations in the atmosphere are suspected to cause coughing, sneezing, headaches, weakness, laryngitis, and bronchitis, even at low concentrations. Some hydrocarbon components classified as VOC emissions are thought or known to be hazardous. Benzene, for example, one hydrocarbon component of VOC emissions, is known to be a human carcinogen.

3.2.2 NON-CRITERIA POLLUTANTS

Although SCAQMD's primary mandate is attaining the state and NAAQS for criteria pollutants within the Basin, SCAQMD also has a general responsibility pursuant to H&S §41700 to control emissions of air contaminants and prevent endangerment to public health. Additionally, state law requires SCAQMD to implement airborne toxic control measures (ATCM) adopted by CARB and to implement the Air Toxics "Hot Spots" Act. As a result, SCAQMD has regulated pollutants other than criteria pollutants such as TACs, greenhouse gases and stratospheric ozone depleting compounds. SCAQMD has developed a number of rules to control non-criteria pollutants from both new and existing sources. These rules originated through state directives, CAA requirements, or SCAQMD rulemaking process.

In addition to promulgating non-criteria pollutant rules, SCAQMD has been evaluating AQMP control measures as well as existing rules to determine whether or not they would affect, either positively or negatively, emissions of non-criteria pollutants. For example, rules in which VOC components of coating materials are replaced by a non-photochemically reactive chlorinated substance would reduce the impacts resulting from ozone formation, but could increase emissions of toxic compounds or other substances that may have adverse impacts on human health.

The following subsections summarize the existing setting for the two major categories of non-criteria pollutants: compounds that contribute to TACs, global climate change, and stratospheric ozone depletion.

3.2.2.1 Air Quality – Toxic Air Contaminants

3.2.2.1.1 Federal

Under Section 112 of the CAA, U.S. EPA is required to regulate sources that emit one or more of the 187 federally listed hazardous air pollutants (HAPs). HAPs are air toxic pollutants identified in the CAA, which are known or suspected of causing cancer or other serious health effects. The federal HAPs are listed on the U.S. EPA website at http://www.epa.gov/ttn/atw/orig189.html. In order to implement the CAA, approximately 100 National Emission Standards for Hazardous Air Pollutants (NESHAPs) have been promulgated by U.S. EPA for major sources (sources emitting greater than 10 tpy of a single HAP or greater than 25 tpy of multiple HAPs). SCAQMD can either directly implement NESHAPs or adopt rules that contain requirements at least as stringent as the NESHAP requirements. However, since NESHAPs often apply to sources in the Basin that are controlled, many of the sources that would have been subject to federal requirements already comply or are exempt.

In addition to the major source NESHAPs, U.S. EPA has also controlled HAPs from urban areas by developing Area Source NESHAPs under their Urban Air Toxics Strategy. U.S. EPA defines an area source as a source that emits less than 10 tons annually of any single hazardous air pollutant or less than 25 tons annually of a combination of hazardous air pollutants. The CAA requires the U.S. EPA to identify a list of at least 30 air toxics that pose the greatest potential health threat in urban areas. U.S. EPA is further required to identify and establish a list of area source categories that represent 90 percent of the emissions of the 30 urban air toxics associated with area sources, for which Area Source NESHAPs are to be developed under the CAA. U.S. EPA has identified a total of 70 area source categories with regulations promulgated for more than 30 categories so far.

The federal toxics program recognizes diesel engine exhaust (diesel particulate matter or DPM) as a health hazard, however, DPM itself is not one of their listed toxic air contaminants. Rather, each toxic compound in the speciated list of compounds in exhaust is considered separately. Although there are no specific NESHAP regulations for DPM, DPM reductions are realized through federal regulations including diesel fuel standards and emission standards for stationary, marine, and locomotive engines; and idling controls for locomotives.

3.2.2.1.2 State

The California air toxics program was based on the CAA and the original federal list of hazardous air pollutants. The state program was established in 1983 under the Toxic Air Contaminant Identification and Control Act, Assembly Bill (AB) 1807, Tanner. Under the state program, toxic air contaminants are identified through a two-step process of risk identification and risk management. This two-step process was designed to protect residents from the health effects of toxic substances in the air.

Control of TACs under the TAC Identification and Control Program: California's TAC identification and control program, adopted in 1983 as AB 1807, is a two-step program in which substances are identified as TACs and ATCMs are adopted to control emissions from specific sources. CARB has adopted a regulation designating all 188 federal hazardous air pollutants (HAPs) as TACs.

ATCMs are developed by CARB and implemented by SCAQMD and other air districts through the adoption of regulations of equal or greater stringency. Generally, the ATCMs reduce emissions to achieve exposure levels below a determined health threshold. If no such threshold levels are determined, emissions are reduced to the lowest level achievable through the best available control technology unless it is determined that an alternative level of emission reduction is adequate to protect public health.

Under California law, a federal NESHAP automatically becomes a state ATCM, unless CARB has already adopted an ATCM for the source category. Once a NESHAP becomes an ATCM, CARB and each air pollution control or air quality management district have certain responsibilities related to adoption or implementation and enforcement of the NESHAP/ATCM.

Control of TACs under the Air Toxics "Hot Spots" Act: The Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588) establishes a statewide program to inventory and assess the risks from facilities that emit TACs and to notify the public about significant health risks associated with the emissions. Facilities are phased into the AB 2588 program based on their emissions of criteria pollutants or their occurrence on lists of toxic emitters compiled by SCAQMD. Phase I consists of facilities that emit over 25 tons per year of any criteria pollutant and facilities present on SCAQMD's toxics list. Phase I facilities entered the program by reporting their TAC emissions for calendar year 1989. Phase II consists of facilities that emit between 10 and 25 tpy of any criteria pollutant, and submitted air toxic inventory reports for calendar year 1990 emissions. Phase III consists of certain designated types of facilities which emit less than 10 tons per year of any criteria pollutant, and submitted inventory reports for calendar year 1991 emissions. Inventory reports are required to be updated every four years under the state law.

Air Toxics Control Measures: As part of its risk management efforts, CARB has passed state ATCMs to address air toxics from mobile and stationary sources. Some key ATCMs for stationary sources include reductions of benzene emissions from service stations, hexavalent chromium emissions from chrome plating, perchloroethylene emissions from dry cleaning, ethylene oxide emissions from sterilizers, and multiple air toxics from the automotive painting and repair industries.

Many of CARB's recent ATCMs are part of the CARB Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles (Diesel Risk Reduction Plan) which was adopted in September 2000 (http://www.arb.ca.gov/diesel/documents/rrpapp.htm) with the goal of reducing DPM emissions from compression ignition engines and associated health risk by 75 percent by 2010 and 85 percent by 2020. The Diesel Risk Reduction Plan includes strategies to reduce emissions from new and existing engines through the use of ultra-low sulfur diesel fuel, add-on controls, and engine replacement. In addition to stationary source engines, the plan addresses DPM emissions from mobile sources such as trucks, buses, construction equipment, locomotives, and ships.

OEHHA Health Risk Assessment Guidelines: In 2003, OEHHA developed and approved its Health Risk Assessment Guidance document (2003 OEHHA Guidelines) and prepared a series of Technical Support Documents, reviewed and approved by the Scientific Review Panel (SRP), that provided new scientific information showing that early-life exposures to air toxics contribute to an increased estimated lifetime risk of developing cancer and other adverse health effects, compared to exposures that occur in adulthood. As a result, OEHHA developed the Revised OEHHA Guidelines in March 2015 which incorporated this new scientific information. The new method utilizes higher estimates of cancer potency during early life exposures. There are also differences in the assumptions on breathing rates and length of residential exposures.

3.2.2.1.3 SCAQMD

SCAQMD has regulated criteria air pollutants using either a technology-based or an emissions limit approach. The technology-based approach defines specific control technologies that may be installed to reduce pollutant emissions. The emissions limit approach establishes an emission limit, and allows industry to use any emission control equipment, as long as the emission requirements are met. The regulation of TACs often uses a health risk-based approach, but may also require a regulatory approach similar to criteria pollutants, as explained in the following subsections.

Rules and Regulations: Under SCAQMD's toxic regulatory program there are 23 source-specific rules that target toxic emission reductions that regulate over 10,000 sources such as metal finishing, spraying operations, dry cleaners, film cleaning, gasoline dispensing, and diesel-fueled stationary engines to name a few. In addition, other source-specific rules targeting criteria pollutant reductions also reduce toxic emissions, such as Rule 461 – Gasoline Transfer and Dispensing which reduces benzene emissions from gasoline dispensing and Rule 1124 – Aerospace Assembly and Component Manufacturing Operations which reduces perchloroethylene, trichloroethylene, and methylene chloride emissions from aerospace operations. Table 3.2-7 shows the recently amended or adopted toxics rules.

New and modified sources of toxic air contaminants in the SCAQMD are subject to Rule 1401 - New Source Review of Toxic Air Contaminants and Rule 212 - Standards for Approving Permits. Rule 212 requires notification of SCAQMD's intent to grant a permit to construct a significant project, defined as a new or modified permit unit located within 1000 feet of a school (a state law requirement under AB 3205), a new or modified permit unit posing a maximum individual cancer risk of one in one million (1×10^{6}) or greater, or a new or modified facility with criteria pollutant emissions exceeding specified daily maximums. Distribution of notice is required to all addresses within a quarter mile radius, or other area deemed appropriate by SCAQMD. Rule 1401 currently controls emissions of carcinogenic and non-carcinogenic (health effects other than cancer) air contaminants from new, modified and relocated sources by specifying limits on cancer risk and hazard index (explained further in the following discussion), respectively. The rule lists nearly 300 TACs that are evaluated during SCAQMD's permitting process for new, modified or relocated sources. During the past decade, more than ten compounds have been added or had risk values amended. The addition of DPM from diesel-fueled internal combustion engines as a TAC in March 2008 was the most significant of recent amendments to the rule.

TABLE 3.2-7

SCAQMD Air Toxic Rules Recently Amended or Adopted[1]

Rule	Source Category	Key Adoption/ Amendment Dates	TAC	Number of Facilities	Estimated Emission Reductions	Final Emission Limit	Final Ambient Limit
1156	Cement Manufacturing	3/6/2009 *(amended)* 11/6/2015 *(amended)*	Hexavalent Chromium	2	32 lbs/yr (Cr+6)	N/A	0.2 ng/m3 (Cr+6)
1401	New Source Review of Toxic Air Contaminants	6/5/2015 *(amended)*	Multiple TACs	All permitted facilities	N/A	N/A	N/A
1401.1	Requirements for New and Relocated Facilities Near Schools	6/5/2015 *(amended)*	Multiple TACs	All permitted facilities	N/A	N/A	N/A
1402	Control of Toxic Air Contaminants from Existing Sources	6/5/2015 *(amended)*	Multiple TACs	All permitted facilities	N/A	N/A	N/A
1420.1	Lead-acid Battery Recycling	11/5/2010 *(adopted)* 1/10/2014 *(amended)* 3/6/2015 *(amended)* 9/4/2015 *(amended)*	Lead Arsenic Benzene 1,3-Butadiene	2	31 lbs/yr (Arsenic) 3,673 lbs/yr (Benzene) 485 lbs/yr (1,3-Butadiene)	0.00114 lb/hr (Arsenic) 0.003 lb/hr (Lead)	10.0 ng/m3 (Arsenic) 0.100 µg/m3 (Lead)
1420.2	Metal Melting Facilities	10/2/2015 *(adopted)*	Lead	13	N/A	99% control efficiency or 0.0003 lb/hr (Lead)	0.100 µg/m3 (Lead)
1470[1]	Stationary Diesel-Fueled Engines	5/4/2012 *(amended)*	Diesel PM	~4900	N/A	0.01 to 0.15 g/bhp-hr for new engines near a sensitive receptor	N/A

[1] Implements ATCM for stationary compression and ignition engines

Rule 1401.1 – Requirements for New and Relocated Facilities Near Schools sets risk thresholds for new and relocated facilities near schools. The requirements are more stringent than those for other air toxics rules in order to provide additional protection to school children.

Air Toxics Control Plan: On March 17, 2000, the SCAQMD Governing Board approved the Air Toxics Control Plan (2000 ATCP) which was the first comprehensive plan in the nation to guide future toxic rulemaking and programs. The ATCP was developed to lay out SCAQMD's air toxics control program which built upon existing federal, state, and local toxic control programs as well as co-benefits from implementation of SIP measures. The concept for the plan was an outgrowth of the Environmental Justice principles and the Environmental Justice Initiatives adopted by SCAQMD Governing Board on October 10, 1997. Monitoring studies and air toxics regulations that were created from these initiatives emphasized the need for a more systematic approach to reducing toxic air contaminants. The intent of the plan was to reduce exposure to air toxics in an equitable and cost-effective manner that promotes clean, healthful air in the SCAQMD. The plan proposed control strategies to reduce TACs in the SCAQMD implemented between years 2000 and 2010 through cooperative efforts of SCAQMD, local governments, CARB and U.S. EPA.

Cumulative Impact Reduction Strategies (CIRS): The CIRS was presented to the SCAQMD Governing Board on September 5, 2003 as part of the White Paper on Regulatory Options for Addressing Cumulative Impacts from Air Pollution Emissions. The resulting 25 cumulative impacts strategies were a key element of the Addendum to March 2000 Final Draft Air Toxics Control Plan for Next Ten Years (2004 Addendum). The strategies included rules, policies, funding, education, and cooperation with other agencies. Some of the key SCAQMD accomplishments related to the cumulative impacts reduction strategies were:

- Rule 1401.1 which set more stringent health risk requirements for new and relocated facilities near schools
- Rule 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines which established DPM emission limits and other requirements for dieselfueled engines
- Rule 1469.1 – Spraying Operations Using Coatings Containing Chromium which regulated chrome spraying operations
- Rule 410 – Odor from Transfer Stations and Material Recovery Facilities which addresses odors from transfer stations and material recovery facilities
- Intergovernmental Review comment letters for CEQA documents
- SCAQMD's land use guidance document
- Additional protection in toxics rules for sensitive receptors, such as more stringent requirements for chrome plating operations and diesel engines located near schools

2004 Addendum: The 2004 Addendum was adopted by the SCAQMD Governing Board on April 2, 2004 and served as a status report regarding implementation of the various mobile and stationary source strategies in the 2000 ATCP and introduced new measures to further address air toxics. The main elements of the 2004 Addendum were to address the progress made in the implementation of the 2000 ATCP control strategies provide a historical perspective of air toxic emissions and current air toxic levels; incorporate the CIRS approved in 2003 and additional measures identified in the 2003 AQMP; project future air toxic levels to the extent feasible; and summarize future efforts to develop the next ATCP. Significant progress had been made in implementing most of SCAQMD strategies from the 2000 ATCP and the 2004 Addendum. CARB has also made notable progress in mobile source measures via its Diesel Risk Reduction Plan, especially for goods movement related sources, while the U.S. EPA continued to implement their air toxic programs applicable to stationary sources.

Clean Communities Plan: On November 5, 2010, the SCAQMD Governing Board approved the 2010 Clean Communities Plan (CCP). The CCP was an update to the 2000 ATCP and the 2004 Addendum. The objective of the 2010 CCP was to reduce the exposure to air toxics and air-related nuisances throughout the SCAQMD, with emphasis on cumulative impacts. The elements of the 2010 CCP are community exposure reduction, community participation, communication and outreach, agency coordination, monitoring and compliance, source-specific programs, and nuisance. The centerpiece of the 2010 CCP is a pilot study through which SCAQMD staff works with community stakeholders to identify and develop solutions community-specific to air quality issues in two communities: (1) the City of San Bernardino; and (2) Boyle Heights and surrounding areas.

Control of TACs under the Air Toxics "Hot Spots" Act: On October 2, 1992, the SCAQMD Governing Board adopted public notification procedures for Phase I and II facilities. These procedures specify that AB 2588 facilities must provide public notice when exceeding the following risk levels:

- Maximum Individual Cancer Risk: greater than 10 in one million (10×10^{6})
- Total Hazard Index: greater than 1.0 for TACs except lead, or > 0.5 for lead

Public notice is to be provided by letters mailed to all addresses and all parents of children attending school in the impacted area. In addition, facilities must hold a public meeting and provide copies of the facility risk assessment in all school libraries and a public library in the impacted area.

The AB 2588 Toxics "Hot Spots" Program is implemented through Rule 1402 - Control of Toxic Air Contaminants from Existing Sources. SCAQMD continues to review health risk assessments submitted. Notification is required from facilities with a significant risk under the AB 2588 program based on their initial approved health risk assessments and will continue on an ongoing basis as additional and subsequent health risk assessments are reviewed and approved.

There are currently about 361 facilities in SCAQMD's AB 2588 program. Since 1992 when the state Health and Safety Code (H&S) incorporated a risk reduction requirement in the program, SCAQMD has reviewed and approved over 335 HRAs; 50 facilities were required to do a public notice and 24 facilities were subject to risk reduction. Currently, over 96 percent of the facilities in the program have cancer risks below ten in a million and over 97 percent have acute and chronic hazard indices of less than one (SCAQMD, 2015a).

CEQA Intergovernmental Review Program: SCAQMD staff, through its Intergovernmental Review (IGR) provides comments to lead agencies on air quality analyses and mitigation measures in CEQA documents. The following are some key programs and tools that have been developed more recently to strengthen air quality analyses, specifically as they relate to exposure of mobile source air toxics:

- SCAQMD's Mobile Source Committee approved the "Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Emissions" (August 2002). This document provides guidance for analyzing cancer risks from DPM from truck idling and movement (e.g., truck stops, warehouse and distribution centers, or transit centers), ship hoteling at ports, and train idling.
- CalEPA and CARB's "Air Quality and Land Use Handbook: A Community Health Perspective" (April 2005), provides recommended siting distances for incompatible land uses.
- Western Riverside Council of Governments' Regional Air Quality Task Force developed a policy document titled, "Good Neighbor Guidelines for Siting New and/or Modified Warehouse/Distribution Facilities" (September 2005). This document provides guidance to local government on preventive measures to reduce neighborhood exposure to toxic air contaminants from warehousing facilities.

Environmental Justice (EJ): Environmental justice has long been a focus of SCAQMD. In 1990, SCAQMD formed an Ethnic Community Advisory Group that was restructured as the Environmental Justice Advisory Group (EJAG) in 2008. EJAG's mission is to advise and assist SCAQMD in protecting and improving public health in SCAQMD's most impacted communities through the reduction and prevention of air pollution.

In 1997, the SCAQMD Governing Board adopted four guiding principles and ten initiatives (http://www.aqmd.gov/ej/history.htm) to ensure environmental equity. Also in 1997, the SCAQMD Governing Board expanded the initiatives to include the "Children's Air Quality Agenda" focusing on the disproportionate impacts of poor air quality on children. Some key initiatives that have been implemented were the Multiple Air Toxics Exposure Studies (MATES, MATES II, MATES III, and MATES IV); the Clean Fleet Rules; CIRS; funding for lower emitting technologies under the Carl Moyer Program; the Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning; a guidance document on Air Quality Issues in School Site Selection; and the 2000 ATCP and its 2004 Addendum. Key initiatives focusing on communities and residents include the Clean Air Congress; the Clean School Bus Program; Asthma and Air Quality Consortium; Brain and Lung Tumor and Air Pollution Foundation; air quality presentations to schools and community and civic groups; and Town Hall meetings. Technological and scientific projects and programs have been a large part of SCAQMD's EJ program since its inception. Over time, the EJ program's focus on public education, outreach, and opportunities for public participation have greatly increased. Public education materials and other resources for the public are available on SCAQMD's website (www.aqmd.gov)

AB 2766 Subvention Funds: AB 2766 subvention funds, money collected by the state as part of vehicle registration and passed through to SCAQMD, is used to fund projects in local cities that reduce motor vehicle air pollutants. The Clean Fuels Program, funded by a surcharge on motor vehicle registrations in SCAQMD, reduces TAC emissions through co-funding projects that develop and demonstrate low-emission clean fuels and advanced technologies, and to promote commercialization and deployment of promising or proven technologies in Southern California.

Carl Moyer Program: Another program that targets diesel emission reductions is the Carl Moyer Program which provides grants for projects that achieve early or extra emission reductions beyond what is required by regulations. Examples of eligible projects include cleaner on-road, off-road, marine, locomotive, and stationary agricultural pump engines. Other endeavors of SCAQMD's Technology Advancement Office help to reduce DPM emissions through co-funding research and demonstration projects of clean technologies, such as low-emitting locomotives.

Control of TACs with Risk Reduction Audits and Plans: Senate Bill (SB) 1731, enacted in 1992 and codified at H&S §44390 et seq., amended AB 2588 to include a requirement for facilities with significant risks to prepare and implement a risk reduction plan which will reduce the risk below a defined significant risk level within specified time limits. SCAQMD Rule 1402 was adopted on April 8, 1994 to implement the requirements of SB 1731.

In addition to the TAC rules adopted by SCAQMD under authority of AB 1807 and SB 1731, SCAQMD has adopted source-specific TAC rules, based on the specific level of TAC emitted and the needs of the area. These rules are similar to the state's ATCMs because they are source-specific and only address emissions and risk from specific compounds and operations.

Multiple Air Toxics Exposure Studies

Multiple Air Toxics Exposure Study (MATES): In 1986, SCAQMD conducted the first MATES report to determine the Basin-wide risks associated with major airborne carcinogens. At the time, the state of technology was such that only 20 known air toxic compounds could be analyzed and diesel exhaust particulate did not have an agency accepted carcinogenic health risk value. TACs are determined by U.S. EPA, and by CalEPA, including OEHHA and CARB. For purposes of MATES, the California carcinogenic health risk factors were used. The maximum combined individual health risk for simultaneous exposure to pollutants under the study was estimated to be 600 to 5,000 in one million.

Multiple Air Toxics Exposure Study II (MATES II): At its October 10, 1997 meeting, the SCAQMD Governing Board directed staff to conduct a follow up to the MATES report to quantify the magnitude of population exposure risk from existing sources of selected air toxic contaminants at that time. MATES II included a monitoring program of 40 known air toxic compounds, an updated emissions inventory of toxic air contaminants (including microinventories around each of the 14 microscale sites), and a modeling effort to characterize health risks from hazardous air pollutants. The estimated Basin-wide carcinogenic health risk from ambient measurements was 1,400 per million people. About 70 percent of the Basin-wide health risk was attributed to DPM emissions; about 20 percent to other toxics associated with mobile sources (including benzene, butadiene, and formaldehyde); about 10 percent of Basin-wide health risk was attributed to stationary sources (which include industrial sources and other certain specifically identified commercial businesses such as dry cleaners and print shops.)

Multiple Air Toxics Exposure Study III (MATES III): MATES III was part of the SCAQMD Governing Board's 2003-04 Environmental Justice Workplan approved on September 5, 2003. The MATES III report consisted of several elements including a monitoring program, an updated emissions inventory of toxic air contaminants, and a modeling effort to characterize carcinogenic health risk across the Basin. Besides toxics, additional measurements included organic carbon, elemental carbon, and total carbon, as well as, Particulate Matter (PM), including PM2.5. It did not estimate mortality or other health effects from particulate exposures. MATES III revealed a general downward trend in air toxic pollutant concentrations with an estimated Basin-wide lifetime carcinogenic health risk of 1,200 in one million. Mobile sources accounted for 94 percent of the basin-wide lifetime carcinogenic health risk with diesel exhaust particulate contributing to 84 percent of the mobile source Basin-wide lifetime carcinogenic health risk. Non-diesel carcinogenic health risk declined by 50 percent from the MATES II values.

<u>Multiple Air Toxics Exposure Study IV (MATES IV):</u> MATES IV, the current version, includes a monitoring program, an updated emissions inventory of toxic air contaminants, and a modeling effort to characterize risk across the Basin. The study focuses on the carcinogenic risk from exposure to air toxics but does not estimate mortality or other health effects from particulate exposures. An additional focus of MATES IV is the inclusion of measurements of ultrafine particle concentrations. MATES IV incorporates the updated health risk assessment methodology from OEHHA. Compared to previous studies of air toxics in the Basin, this study found decreasing air toxics exposure, with the estimated Basin-wide population-weighted risk down by about 57 percent from the analysis done for the MATES III time period. The ambient air toxics data from the ten fixed monitoring locations also demonstrated a similar reduction in air toxic levels and risks. On average, diesel particulate contributes about 68 percent of the total air toxics risk. This is a lower portion of the overall risk compared to the MATES III estimates of about 84 percent.

3.2.2.1.4 Health Effects

Carcinogenic Health Risks from TACs: One of the primary health risks of concern due to exposure to TACs is the risk of contracting cancer. The carcinogenic potential of TACs is a particular public health concern because it is currently believed by many scientists that there is no "safe" level of exposure to carcinogens. Any exposure to a carcinogen poses some risk of causing cancer. It is currently estimated that about one in four deaths in the United States is attributable to cancer. The proportion of cancer deaths attributable to air pollution has not been estimated using epidemiological methods.

Non-Cancer Health Risks from TACs: Unlike carcinogens, for most non-carcinogens it is believed that there is a threshold level of exposure to the compound below which it will not pose a health risk. CalEPA's OEHHA develops Reference Exposure Levels (RELs) for TACs which are health-conservative estimates of the levels of exposure at or below which health effects are not expected. The non-cancer health risk due to exposure to a TAC is assessed by comparing the estimated level of exposure to the REL. The comparison is expressed as the ratio of the estimated exposure level to the REL, called the hazard index (HI).

3.2.2.2 Climate Change

Global climate change is a change in the average weather of the Earth, which can be measured by wind patterns, storms, precipitation, and temperature. Historical records have shown that temperature changes have occurred in the past, such as during previous ice ages. Data indicate that the current temperature record differs from previous climate changes in rate and magnitude.

Gases that trap heat in the atmosphere are often called greenhouse gases (GHGs), comparable to a greenhouse, which captures and traps radiant energy. GHGs are emitted by natural processes and human activities. The accumulation of GHGs in the atmosphere regulates the Earth's temperature. Global warming is the observed increase in average temperature of the Earth's surface and atmosphere. The primary cause of global warming is an increase of GHGs in the atmosphere. The six major GHGs are carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), sulfur hexafluoride (SF6), hydrofluorocarbons (HFCs), and perfluorocarbon (PFCs). The GHGs absorb longwave radiant energy emitted by the Earth, which warms the atmosphere. The GHGs also emit longwave radiation both upward to space and back down toward the surface of the Earth. The downward part of this longwave radiation emitted by the atmosphere is known as the "greenhouse effect." Emissions from human activities such as fossil fuel combustion for electricity production and vehicles have elevated the concentration of these gases in the atmosphere.

CO2 is an odorless, colorless greenhouse gas. Natural sources include the following: decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic (human-caused) sources of CO2 are from burning coal, oil, natural gas, and wood.

CH4 is a flammable gas and is the main component of natural gas. N2O, also known as laughing gas, is a colorless greenhouse gas. Some industrial processes such as fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions also contribute to the atmospheric load of N2O. HFCs are synthetic man-made chemicals that are used as a substitute for chlorofluorocarbons (whose production was stopped as required by the Montreal Protocol) for automobile air conditioners and refrigerants. The two main sources of PFCs are primary aluminum production and semiconductor manufacture. SF6 is an inorganic, odorless, colorless, nontoxic, nonflammable gas. SF6 is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

Scientific consensus, as reflected in reports issued by the United Nations Intergovernmental Panel on Climate Change, is that the majority of the observed warming over the last 50 years can be attributed to increased concentration of GHGs in the atmosphere due to human activities. Industrial activities, particularly increased consumption of fossil fuels (e.g., gasoline, diesel, wood, coal, etc.), have heavily contributed to the increase in atmospheric levels of GHGs. The United Nations Intergovernmental Panel on Climate Change constructed several emission trajectories of GHGs needed to stabilize global temperatures and climate change impacts. It concluded that a stabilization of GHGs at 400 to 450 ppm carbon dioxide-equivalent concentration is required to keep global mean warming below two degrees Celsius, which is assumed to be necessary to avoid dangerous impacts from climate change.

The potential health effects from global climate change may arise from temperature increases, climate-sensitive diseases, extreme events, air quality impacts, and sea level rise. There may be direct temperature effects through increases in average temperature leading to more extreme heat waves and less extreme cold spells. Those living in warmer climates are likely to experience more stress and heat-related problems (e.g., heat rash and heat stroke). In addition, climate sensitive diseases may increase, such as those spread by mosquitoes and other disease carrying insects. Those diseases include malaria, dengue fever, yellow fever, and encephalitis. Extreme events such as flooding, hurricanes, and wildfires can displace people and agriculture, which would have negative consequences. Drought in some areas may increase, which would decrease water and food availability. Global warming may also contribute to air quality problems from increased frequency of smog and particulate air pollution.

The impacts of climate change may also affect projects in various ways. Effects of climate change are rising sea levels and changes in snow pack. The extent of climate change impacts at specific locations remains unclear. It is expected that federal, state and local agencies will more precisely quantify impacts in various regions. As an example, it is expected that the California Department of Water Resources will formalize a list of foreseeable water quality issues associated with various degrees of climate change. Once state government agencies make these lists available, they could be used to more precisely determine to what extent a project creates global climate change impacts.

3.2.2.2.1 Federal

Greenhouse Gas Endangerment Findings: On December 7, 2009, the U.S. EPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the CAA. The Endangerment Finding stated that CO2, CH4, N2O, HFCs, PFCs, and SF6, taken in combination, endanger both the public health and the public welfare of current and future generations. The Cause or Contribute Finding stated that the combined emissions from motor vehicles and motor vehicle engines contribute to the greenhouse gas air pollution that endangers public health and welfare. These findings were a prerequisite for implementing GHG standards for vehicles. The U.S. EPA and the National Highway Traffic Safety Administration (NHTSA) finalized emission standards for light-duty vehicles in May 2010 and for heavy-duty vehicles in August of 2011.

Renewable Fuel Standard (RFS): The RFS program was established under the Energy Policy Act (EPAct) of 2005, and required 7.5 billion gallons of renewable-fuel to be blended into gasoline by 2012. Under the Energy Independence and Security Act (EISA) of 2007, the RFS program was expanded to include diesel; required the volume of renewable fuel blended into transportation fuel be increased from nine billion gallons in 2008 to 36 billion gallons by 2022; established new categories of renewable fuel; and required U.S. EPA to apply lifecycle GHG performance threshold standards so that each category of renewable fuel emits fewer GHGs than the petroleum fuel it replaces. The RFS program is expected to reduce greenhouse gas emissions by 138 million metric tons, about the annual emissions of 27 million passenger vehicles, replacing about seven percent of expected annual diesel consumption and decreasing oil imports by $41.5 billion.

GHG Tailoring Rule: On May 13, 2010, U.S. EPA finalized the Tailoring Rule to phase in the applicability of the Prevention of Significant Deterioration (PSD) and Title V operating permit programs for GHGs. The rule was tailored to include the largest GHG emitters, while excluding smaller sources (restaurants, commercial facilities and small farms). The first step (January 2, 2011 to June 30, 2011) addressed the largest sources that contributed 65 percent of the stationary GHG sources. Title V GHG requirements were triggered only when affected facility owners/operators were applying, renewing or revising their permits for non-GHG pollutants. PSD GHG requirements were applicable only if sources were undergoing permitting actions for other non-GHG pollutants and the permitted action would increase GHG emission by 75,000 metric tons of CO2 equivalents (MTCO2e) per year or more.

On June 23, 2014, the U.S. Supreme Court issued its decision in Utility Air Regulatory Group v. EPA, 134 S.Ct. 2427 (2014) ("UARG"). The Court held that U.S. EPA may not treat GHGs as an air pollutant for purposes of determining whether a source is a major source required to obtain a PSD or Title V permit. The Court also held that PSD permits that are otherwise required to be subject to PSD (based on emissions of other pollutants) may continue to require limitations on GHG emissions based on the application of BACT. In accordance with the Supreme Court decision, on April 10, 2015, the D.C. Circuit issued an amended judgment in Coalition for Responsible Regulation, Inc. v. Environmental Protection Agency, Nos. 09-1322, 10-073, 10-1092 and 10-1167 (D.C. Cir. April 10, 2015), which, among other things, vacated the PSD and Title V regulations under review in that case to the extent that they require a stationary source to obtain a PSD or Title V permit solely because the source emits or has the potential to emit GHGs above the applicable major source thresholds.

GHG Reporting Program: U.S. EPA issued the Mandatory Reporting of Greenhouse Gases Rule (40 CFR Part 98) under the 2008 Consolidated Appropriations Act. The Mandatory Reporting of Greenhouse Gases Rule requires reporting of GHG data from large sources and suppliers under the Greenhouse Gas Reporting Program. Suppliers of certain products that would result in GHG emissions if released, combusted or oxidized; direct emitting source categories; and facilities that inject CO2 underground for geologic sequestration or any purpose other than geologic sequestration are included. Facilities that emit 25,000 metric tons or more per year of GHGs in CO2 equivalents (CO2e) are required to submit annual reports to U.S. EPA. For the 2014 calendar, there were over 8,000 entities that reported 3.20 billion metric tons of GHG emissions under this program. CO2 emissions accounted for largest share of direct emissions with 91.5 percent, followed by methane with seven percent, and nitrous oxide and fluorinated gases representing the remaining 1.5 percent (U.S. EPA, 2016a).

National Program to Improve Fuel Economy: On September 15, 2009, the National Highway Traffic Safety Administration (NHTSA) and U.S. EPA announced a proposed joint rule that would explicitly tie fuel economy to GHG emissions reductions requirements. The proposed new corporate average fuel economy (CAFE) Standards would cover automobiles for model years 2012 through 2016, and would require passenger cars and light trucks to meet a combined, per mile, carbon dioxide emissions level. It is estimated that by 2016, this GHG emissions limit could equate an overall light-duty vehicle fleet average fuel economy of as much as 35.5 miles per gallon. The proposed standards would require model year 2016 vehicles to meet an estimated combined average emission level of 250 grams of carbon dioxide per mile under U.S. EPA's GHG program. On November 16, 2011, U.S. EPA and NHTSA issued a joint proposal to extend the national program of harmonized GHG and fuel economy standards to model year 2017 through 2025 passenger vehicles. In August 2012, the President of the United States finalized standards that will increase fuel economy to the equivalent of 54.5 mpg for cars and light-duty trucks by model year 2025.

Clean Power Plan: On August 3, 2015, the President of the United States and the U.S. EPA announced the Clean Power Plan. The Clean Power Plan sets achievable standards to reduce carbon dioxide emissions by 32 percent from 2005 levels by 2030. This Plan establishes final emissions guidelines for states to follow in developing plans to reduce GHG emissions from existing fossil fuel-fired electric generating units (EGUs). Specifically, U.S. EPA is establishing: (1) carbon dioxide emission performance rates representing the best system of emission reduction (BSER) for two subcategories of existing fossil fuel-fired EGUs, fossil fuel-fired electric utility steam generating units and stationary combustion turbines; (2) state-specific carbon dioxide goals reflecting the carbon dioxide emission performance rates; and (3) guidelines for the development, submittal and implementation of state plans that establish emission standards or other measures to implement the carbon dioxide emission performance rates, which may be accomplished by meeting the state goals. This final rule will continue progress already under way in the United States to reduce carbon dioxide emissions from the utility power sector. Recently, the U.S. Supreme Court issued a stay of this rule pending final determination on litigation challenging the rule.

Executive Order (EO) 13693 (2015): Published June 10, 2015, EO 13693, *Planning for Federal Sustainability in the Next Decade*, revokes multiple prior EOs and memorandum including EO 13423 and EO 13514. The new EO outlines forward-looking goals for federal agencies in the area of energy, climate change, water use, vehicle fleets, construction, and acquisition. The goal is to maintain federal leadership in sustainability and GHG emission reductions. Federal agencies shall, where life-cycle cost-effective, beginning in FY 2016:

- Reduce agency building energy intensity as measured in Btu/ft2 by 2.5 percent annually through FY 2025
- Improve data center energy efficiency at agency buildings
- Ensure a minimum percentage of total building electric and thermal energy shall be from clean energy sources
- Improve agency water use efficiency and management (including stormwater management)
- Improve agency fleet and vehicle efficiency and management by achieving minimum percentage GHG emission reductions

3.2.2.2.2 State

EO S-3-05 (2005): In June 2005, then Governor Schwarzenegger signed EO S-3-05, which established emission reduction targets. The goals would reduce GHG emissions to 2000 levels by 2010, then to 1990 levels by 2020, and to 80 percent below 1990 levels by 2050.

AB 32: Global Warming Solutions Act: On September 27, 2006, AB 32, the California Global Warming Solutions Act of 2006, was enacted by the State of California and signed by Governor Schwarzenegger. AB 32 expanded on EO S-3-05. The Legislature stated that "global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California." AB 32 represents the first enforceable statewide program in the

United States to cap all GHG emissions from major industries that includes penalties for non-compliance. While acknowledging that national and international actions will be necessary to fully address the issue of global warming, AB 32 lays out a program to inventory and reduce greenhouse gas emissions in California and from power generating facilities located outside the state that serve California residents and businesses.

Authorized by AB 32, the Cap-and-Trade program is one of several strategies that California uses to reduce greenhouse gas emissions. CARB adopted the California Cap-and-Trade Program final regulations on October 20, 2011 and adopted amended regulations on September 12, 2012, with the first auction for GHG allowances on November 14, 2012. Funds received from the program are deposited into the Greenhouse Gas Reduction Fund and appropriated by the Legislature. It sets a GHG emissions limit that will decrease by two percent each year until 2015, and then three percent from 2015 to 2020 to achieve the goals in AB 32. The program initially applies to large electric power plants and large industrial plants, and included fuel distributors in 2015. These rules encompass 85 percent of all of California's GHG emissions.

SB 97 - CEQA: Greenhouse Gas Emissions: On August 24, 2007, Governor Schwarzenegger signed into law Senate Bill (SB) 97 – CEQA: Greenhouse Gas Emissions stating, "This bill advances a coordinated policy for reducing greenhouse gas emissions by directing the Office of Planning and Research (OPR) and the California Natural Resources Agency to develop CEQA guidelines on how state and local agencies should analyze, and when necessary, mitigate greenhouse gas emissions." OPR's amendments provided guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in draft CEQA documents. The amendments did not establish a threshold for significance for GHG emissions. The amendments became effective on March 18, 2010. SB 97 was repealed on January 1, 2010.

Office of Planning and Research Technical Advisory on CEQA and Climate Change: Consistent with SB 97, on June 19, 2008, OPR released its Technical Advisory on CEQA and Climate Change (Technical Advisory) which was developed in cooperation with the Resources Agency, the CalEPA, and CARB. According to OPR, the Technical Advisory offers the informal interim guidance regarding the steps lead agencies should take to address climate change in their CEQA documents, until CEQA guidelines are developed pursuant to SB 97 on how state and local agencies should analyze, and when necessary, mitigate greenhouse gas emissions.

According to OPR, Lead Agencies should determine whether GHGs may be generated by a proposed project, and if so, quantify or estimate the greenhouse gas emissions by type and source. Second, the Lead Agency must assess whether those emissions are individually or cumulatively significant. When assessing whether a project's effects on climate change are "cumulatively considerable" even though the GHG contribution of the project may be individually limited, the Lead Agency must consider the impact of the project when viewed in connection with the effects of past, current, and probable future projects. Finally, if the Lead Agency determines that the greenhouse gas emissions from the project as proposed are potentially significant, it must investigate and implement ways to avoid, reduce, or otherwise mitigate the impacts of those emissions.

In 2014, total California GHG emissions were 441.5 million metric tons (or tonnes) of carbon dioxide equivalent (MMTCO2e). This represents a 2.58 percent decrease in total GHG emissions from 2013. Since the peak in 2001, GHG emissions have decreased by 28 percent.

In 2014, the transportation sector is the largest source of emissions, accounting for approximately 36 percent of the total emissions. On-road vehicles accounted for the majority of emissions in the transportation sector. Transportation related GHG emissions have dropped 13 percent since peak levels in 2005. The industrial sector accounted for approximately 21 percent of the total emissions. Emissions from this sector declined through 2009, then remain relatively consistent over the past few years. Emissions from electricity generation were about 20 percent of total emissions. Emissions from this sector declined by 1.6 percent in 2014 compared to 2013

Per capita emissions in California have decreased by 18 percent from 2000 to 2014, in spite of the overall increase in population during the same period. Overall trends in the inventory also demonstrate that the carbon intensity of California's economy (the amount of carbon pollution per million dollars of gross domestic product (GDP)) is declining, representing a 28 percent decline since the 2001 peak, while the state's GDP has grown 28 percent during this period (CARB, 2016).

From a broader geographical perspective, California ranks second in the United States in total GHG emissions; Texas remains the leading GHG emitting state. However, from a per capita and per GDP standpoint, California has the 45th and 46th lowest emissions respectively. On an international scale, California has the 20th largest GHG emissions and the 38th largest per capita emissions for year 2010 (CARB, 2014).

AB 1493 Vehicular Emissions: Carbon Dioxide: Prior to the U.S. EPA and NHTSA joint rulemaking, Governor Schwarzenegger signed AB 1493 (2002). AB 1493 requires that CARB develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of GHGs emitted by passenger vehicles and light-duty trucks and other vehicles determined by CARB to be vehicles whose primary use is noncommercial personal transportation in the state."

CARB originally approved regulations to reduce GHGs from passenger vehicles in September 2004, with the regulations to take effect in 2009 (see amendments to CCR Title 13, Sections 1900 and 1961 (13 CCR 1900, 1961) and adoption of Section 1961.1 (13 CCR 1961.1)). California's first request to the U.S. EPA to implement GHG standards for passenger vehicles was made in December 2005 and denied in March 2008. The U.S. EPA then granted California the authority to implement GHG emission reduction standards for new passenger cars, pickup trucks and sport utility vehicles on June 30, 2009.

On April 1, 2010, CARB filed amended regulations for passenger vehicles as part of California's commitment toward the National Program to reduce new passenger vehicle GHGs from 2012 through 2016. The amendments will prepare California to harmonize its rules with the federal Light-Duty Vehicle GHG Standards and CAFE Standards (discussed above).

Senate Bill 1368 (2006): SB 1368 is the companion bill of AB 32 and was signed by Governor Schwarzenegger in September 2006. SB 1368 requires the California Public Utilities Commission (PUC) to establish a GHG emission performance standard for baseload generation from investor owned utilities by February 1, 2007. The California Energy Commission (CEC) must establish a similar standard for local, publicly owned utilities by June 30, 2007. These standards cannot exceed the GHG emission rate from a baseload combined-cycle natural gas fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the PUC and CEC.

EO S-1-07 (2007): Governor Schwarzenegger signed EO S-1-07 in 2007 which finds that the transportation sector is the main source of GHG emissions in California. The EO proclaims the transportation sector accounts for over 40 percent of statewide GHG emissions. The EO also establishes a goal to reduce the carbon intensity of transportation fuels sold in California by a minimum of 10 percent by 2020.

In particular, the EO established a Low-Carbon Fuel Standard (LCFS) and directed the Secretary for Environmental Protection to coordinate the actions of the CEC, CARB, the University of California, and other agencies to develop and propose protocols for measuring the "life-cycle carbon intensity" of transportation fuels. This analysis supporting development of the protocols was included in the SIP for alternative fuels (State Alternative Fuels Plan adopted by CEC on December 24, 2007) and was submitted to CARB for consideration as an "early action" item under AB 32. CARB adopted the LCFS on April 23, 2009.

Senate Bill 375 (2008): SB 375, signed in September 2008, aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. As part of the alignment, SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy (APS) which prescribes land use allocation in that MPO's Regional Transportation Plan (RTP). CARB, in consultation with MPOs, is required to provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every eight years but can be updated every four years if advancements in emissions technologies affect the reduction strategies to achieve the targets. CARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned GHG emission reduction targets. CARB set the following reduction targets for SCAG: reduce per capita eight percent of GHG emissions below 2005 levels by 2020 and 13 percent below 2005 levels by 2035.

SB 375 has three major components:

- Using the regional transportation planning process to achieve reductions in GHG emissions consistent with AB 32's goals.
- Offering streamlined environmental review opportunities for eligible projects, should project proponents decide to pursue.
- Coordinating the Regional Housing Needs Allocation Assessment (RHNA) process with the regional transportation process while maintaining local authority over land use decisions.

EO S-13-08 (2008): Governor Schwarzenegger signed EO S-13-08 on November 14, 2008 which directs California to develop methods for adapting to climate change through preparation of a statewide plan. The EO directs OPR, in cooperation with the California Natural Resources

Agency, to provide land use planning guidance related to sea level rise and other climate change impacts.

Senate Bills 1078 and 107 and EO S-14-08 (2008): SB 1078 (Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010. In November 2008, then Governor Schwarzenegger signed EO S-14-08, which expands the state's Renewable Portfolio Standard to 33 percent renewable power by 2020.

SB X-1-2 and the Clean Energy and Pollution Reduction Act of 2015: SB X-1-2 was signed by Governor Edmund G. Brown, Jr., in April 2011. SB X-1-2 created a new Renewables Portfolio Standard (RPS), which preempted CARB's 33 percent Renewable Electricity Standard. The new RPS applies to all electricity retailers in the state including publicly owned utilities (POUs), investor-owned utilities, electricity service providers, and community choice aggregators. These entities must adopt the new RPS goals of 20 percent of retail sales from renewables by the end of 2013, 25 percent by the end of 2016, and the 33 percent requirements by the end of 2020.

Clean Energy and Pollution Reduction Act of 2015, SB 350 (Chapter 547, Statutes of 2015) was approved by Governor Brown on October 7, 2015. SB 350 will (1) increase the standards of the California RPS program by requiring that the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources be increased to 50 percent by December 31, 2030; (2) require the State Energy Resources Conservation and Development Commission to establish annual targets for statewide energy efficiency savings and demand reduction that will achieve a cumulative doubling of statewide energy efficiency savings in electricity and natural gas final end uses of retail customers by January 1, 2030; (3) provide for the evolution of the Independent System Operator (ISO) into a regional organization; and (4) require the state to reimburse local agencies and school districts for certain costs mandated by the state through procedures established by statutory provisions. Among other objectives, the Legislature intends to double the energy efficiency savings in electricity and natural gas final end uses of retail customers through energy efficiency and conservation.

SB 862: In June 2014, SB 862 (Chapter 36, Statutes of 2014) established long-term funding programs from the Cap and Trade program for transit, sustainable communities and affordable housing, and high speed rail. SB 862 allocates 60 percent of ongoing Cap and Trade revenues, beginning in 2015–2016, to these programs. The remaining 40 percent is to be determined by future legislatures. A minimum of 25 percent of Cap and Trade dollars must go to projects that provide benefits to disadvantaged communities, and a minimum of ten percent must go to projects located within those disadvantaged communities. In addition, this bill established the CalRecycle Greenhouse Gas Reduction Revolving Loan Program and Fund.

Senate Bills 32 and 350 and EO B-30-15 (2015): Governor Brown signed EO B-30-15 in 2015 in order to reduce GHG emissions by 40 percent below 1990 levels by 2030 to ensure California meets its target of reducing GHG emissions to 80 percent of 1990 levels by 2050.

In particular, the EO commissioned CARB to update the Climate Change Scoping Plan and the California Natural Resources Agency to update the state climate adaption strategy, Safeguarding California, every three years. The Safeguarding California Plan will identify vulnerabilities to climate change by sector and regions, including, at a minimum, the following sectors: water, energy, transportation, public health, agriculture, emergency services, forestry, biodiversity and habitat, and ocean and coastal resources; outline primary risks to residents, property, communities and natural systems from these vulnerabilities, and identify priority actions needed to reduce these risks; and identify a Lead Agency or group of agencies to lead adaptation efforts in each sector.

3.2.2.2.3 SCAQMD

SCAQMD adopted a "Policy on Global Warming and Stratospheric Ozone Depletion" on April 6, 1990. The policy commits SCAQMD to consider global impacts in rulemaking and in drafting revisions to the AQMP. On March 6, 1992, the SCAQMD Governing Board reaffirmed this policy and adopted amendments to the policy to include support of the adoption of a California GHG emission reduction goal.

Basin GHG Policy and Inventory: SCAQMD has established a policy, adopted by the SCAQMD Governing Board at its September 5, 2008 meeting, to actively seek opportunities to reduce emissions of criteria, toxic, and climate change pollutants. The policy includes the intent to assist businesses and local governments implementing climate change measures, decrease the agency's carbon footprint, and provide climate change information to the public. SCAQMD will take the following actions:

1. Work cooperatively with other agencies/entities to develop quantification protocols, rules, and programs related to GHGs;
2. Share experiences and lessons learned relative to the Regional Clean Air Incentives Market (RECLAIM) to help inform state, multi-state, and federal development of effective, enforceable cap-and-trade programs. To the extent practicable, staff will actively engage in current and future regulatory development to ensure that early actions taken by local businesses to reduce GHGs will be treated fairly and equitably. SCAQMD staff will seek to streamline administrative procedures to the extent feasible to facilitate the implementation of AB 32 measures;
3. Review and comment on proposed legislation related to climate change and GHGs, pursuant to the 'Guiding Principles for SCAQMD Staff Comments on Legislation Relating to Climate Change' approved at the SCAQMD Governing Board Retreat in April 2008;
4. Provide higher priority to funding Technology Advancement Office projects or contracts that also reduce GHG emissions;
5. Develop recommendations through a public process for an interim GHG CEQA significance threshold, until such time that an applicable and appropriate statewide GHG significance level is established. Provide guidance on analyzing GHG emissions and identify mitigation measures. Continue to consider GHG impacts and mitigation in SCAQMD Lead Agency documents and in comments when SCAQMD is a responsible agency;
6. Revise SCAQMD's Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning to include information on GHG strategies as a resource for local

governments. The Guidance Document will be consistent with state guidance, including CARB's Scoping Plan;

7. Bring recommendations to the SCAQMD Governing Board on how the agency can reduce its own carbon footprint, including drafting a Green Building Policy with recommendations regarding SCAQMD purchases, building maintenance, and other areas of products and services. Assess employee travel as well as other activities that are not part of a GHG inventory and determine what GHG emissions these activities represent, how they could be reduced, and what it would cost to offset the emissions;
8. Provide educational materials concerning climate change and available actions to reduce GHG emissions on the SCAQMD website, in brochures, and other venues to help cities and counties, businesses, households, schools, and others learn about ways to reduce their electricity and water use through conservation or other efforts, improve energy efficiency, reduce vehicle miles traveled, access alternative mobility resources, utilize low emission vehicles and implement other climate friendly strategies; and
9. Conduct conferences, or include topics in other conferences, as appropriate, related to various aspects of climate change, including understanding impacts, technology advancement, public education, and other emerging aspects of climate change science.

On December 5, 2008, the SCAQMD Governing Board adopted the staff proposal for an interim GHG significance threshold for projects where SCAQMD is the Lead Agency. SCAQMD's recommended interim GHG significance threshold proposal uses a tiered approach to determining significance. Tier 1 consists of evaluating whether or not the project qualifies for any applicable exemption under CEQA. Tier 2 consists of determining whether or not the project is consistent with a GHG reduction plan that may be part of a local general plan, for example. Tier 3 establishes a screening significance threshold level to determine significance using a 90 percent emission capture rate approach, which corresponds to 10,000 MTCO2e emissions per year. Tier 4, to be based on performance standards, is yet to be developed. Under Tier 5 the project proponent would allow offsets to reduce GHG emission impacts to less than the proposed screening level. If CARB adopts statewide significance thresholds, SCAQMD staff plans to report back to the SCAQMD Governing Board regarding any recommended changes or additions to SCAQMD's interim threshold.

Table 3.2-8 presents the GHG emission inventory by major source categories in calendar year 2008. The emissions reported herein are based on in-Basin energy consumption and do not include out-of-Basin energy production (e.g., power plants, crude oil production) or delivery emissions (e.g., natural gas pipeline loss). These GHG emissions are reported in MMTCO2e. Mobile sources generate 59.4 percent of the equipment, airport equipment, oil and gas drilling equipment. The remaining 40.6 percent of the total Basin GHG emissions are from stationary and area sources. The largest stationary/area source is fuel combustion, which is 27.8 percent of the total Basin GHG emissions (68.6 percent of the GHG emissions from the stationary and area source category).

Table 3.2-9 presents the GHG emission inventory by fuel type in calendar year 2012 for the Basin. These GHG emissions are reported in metric tons of CO2. Gasoline generates 53 percent of the GHG emissions from fuel combustion. Natural gas generates 31 percent of the GHG emissions from fuel combustion. The remaining 20 percent of the total Basin GHG emissions from fuel combustion are from diesel, jet fuel, LPG, and fuel oil (2016 AQMP, Chapter 10).

TABLE 3.2-8

2008 GHG Emissions for the Basin

Source Category	Emissions						
	CO_2	N_2O	CH_4	CO_2	N_2O	CH_4	CO_2e
	(TPD)			(TPY)			(MMT)
Fuel Combustion							
Electric Utilities	34,303	0.08	0.71	12,520,562	29.0	258	11.4
Cogeneration	872	0.00	0.02	318,340	0.60	6.00	0.29
Oil and Gas Production (Combustion)	2,908	0.01	0.08	1,061,470	4.71	29.5	0.96
Petroleum Refining (Combustion)	44,654	0.06	0.57	16,298,766	20.7	207	14.8
Manufacturing and Industrial	22,182	0.06	0.48	8,096,396	20.9	174	7.35
Food and Agricultural Processing	927	0.00	0.02	338,516	0.84	7.16	0.31
Service and Commercial	21,889	0.08	0.59	7,989,416	30.8	215	7.26
Other	2,241	0.02	0.16	818,057	8.58	58	0.75
Total Fuel Combustion	**129,977**	**0.32**	**2.62**	**47,441,523**	**116**	**956**	**43.1**
Petroleum Production and Marketing							
Oil and Gas Production	92.1	0.00	0.92	33,605	0.06	336	0.04
Petroleum Refining	770	0.00	1.65	280,932	0.36	603	0.27
Petroleum Marketing			83.8	0	0.00	30,598	0.58
Other			0.00	0	0.00	0	0.00
Total Petroleum Production and Marketing	**862**	**0.00**	**86.4**	**314,536**	**0.42**	**31,537**	**0.89**
Other Source Categories							
Total Waste Disposal(b)	3,772	0.04	508	1,376,870	14.9	185,278	4.78
Total Cleaning and Surface Coatings(c)	2,648	0.00	0.33	966,628	1.22	122	0.88
Total Industrial Processes(d)	279	0.00	1.49	101,832	0.19	543	0.10
Total Solvent Evaporation(e)	0.00	0.00	0.07	0.00	0.00	24.20	0.00
Total Miscellaneous Processes(f)	38,850	0.12	27.9	14,180,326	45.3	10,179	13.1
Total On-Road Motor Vehicles(g)	217,480	6.11	8.26	79,380,188	155	187	72.7
Total Other Mobile Sources(h)	57,572	1.83	8.95	21,013,816	668	3,268	19.3
Total Other Source Categories	**320,601**	**8.10**	**555**	**117,019,660**	**885**	**199,601**	**111**
Total 2008 Baseline GHG Emissions for Basin	**451,440**	**8.42**	**644**	**164,775,719**	**1,001**	**232,094**	**155**

Source: (SCAQMD, 2012)

(a) MMT = million metric tons.
(b) Waste Disposal includes sewage treatment, landfills, incineration, and other waste disposal.
(c) Cleaning and Surface Coatings includes laundering, degreasing, coatings and related processes, printing, adhesives and sealants, and other cleaning and surface coatings.
(d) Industrial Processes include chemical, food and agriculture, mineral processes, metal processes, wood and paper, glass and related products, electronic, and other industrial processes.
(e) Solvent Evaporation includes consumer products, architectural coating and related solvents, pesticides and fertilizers, and asphalt paving and roofing.
(f) Miscellaneous Processes include residential fuel combustion, farming operations, construction and demolition, paved road dust, unpaved road dust, fugitive windblown dust, fires, waste burning and disposal, utility equipment, cooking, and other miscellaneous processes.
(g) On-Road Motor Vehicles include trucks (all sizes), motorcycles, buses (all types), and motorhomes.
(h) Other Mobile Sources include aircraft; trains; ships; commercial boats, construction, airport, and oil and gas drilling equipment.

TABLE 3.2-9

2012 GHG Emissions from Fuel Use in the Basin

Fuel Type	Consumption (Gallons)	Gas Supply (Therms)	CO2 Emissions (MT)
Gasoline	7,647,883,106	-	67,148,414
On-Road	7,108,714,450		62,414,512.87
Off-Road	539,168,656		4,733,900.80
Diesel	1,423,889,933	-	14,537,916
On-Road	872,963,200		8,912,954.27
Commercial Harborcraft	21,912,232		223,723.89
Trains	33,129,134		338,248.46
Off-Road	495,885,367		5,062,989.59
Jet Fuel	508,249,568.11		4,955,433.29
Fuel Oil - OGV (Residual Fuel Oil 5/6)	23,960,515.63		282,734.08
Natural Gas	8,831,724,016	7,359,770,013	39,389,489
Residential	2,445,612,164	2,038,010,137	10,907,430.25
Commercial	990,525,700	825,438,083	4,417,744.62
Industrial	1,592,974,552	1,327,478,793	7,104,666.50
NGV	132,285,600	110,238,000	589,993.78
EG	3,670,326,000	3,058,605,000	16,369,653.96
LPG	182,009,738		1,053,836
Residential	115,838,116		670,702.69
Commercial	43,807,549		253,645.71
Industrial	22,364,073		129,487.98
Total	**18,671,716,877**		**127,367,823**

Source: 2016 AQMP

3.3 ENERGY

The purpose of the 2016 AQMP is to address the federal 2008 8-hour ozone standard, the 2012 annual PM2.5 standard, and the 2006 24-hour PM2.5 standard, to satisfy the planning requirements of the federal CAA, and to provide an update on the strategy to meet the 1997 8-hour ozone NAAQS and 1979 1-hour ozone NAAQS. Some of the proposed control measures intended to improve overall air quality may have direct or indirect energy impacts associated with their implementation. This subsection describes the existing setting relate to energy production and demand within California and the Basin.

3.3.1 REGULATORY SETTING

Federal and state agencies regulate energy use and consumption through various means and programs. On the federal level, the United States Department of Transportation (U.S. DOT), United States Department of Energy (U.S. DOE), and United States Environmental Protection Agency (U.S. EPA) are three agencies with substantial influence over energy policies and programs. Generally, federal agencies influence transportation energy consumption through establishment and enforcement of fuel economy standards for automobiles and light trucks, through funding of energy related research and development projects, and through funding for transportation infrastructure projects.

On the state level, the California Public Utilities Commission (CPUC) and California Energy Commission (CEC) are two agencies with authority over different aspects of energy. The CPUC regulates privately-owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies. The CEC collects and analyzes energy-related data; forecasts future energy needs; promotes energy efficient and conservation by setting appliance and building energy efficiency standards; supports energy research; develops renewable energy resources, promotes alternative and renewable transportation fuels and technologies; certifies thermal power plants 50 megawatts (MW) and larger; and plans for and directs state response to energy emergencies. Some of the more relevant federal and state transportation-energy-related laws and plans are discussed in the following subsections.

3.3.1.1 Federal Regulations

3.3.1.1.1 Energy Policy and Conservation Act

The Energy Policy and Conservation Act of 1975 (EPCA) was enacted for the purpose of serving the nation’s energy demands and promoting conservation methods when feasibly obtainable. Since being enacted on December 22, 1975, EPCA has been amended to:

- Grant specific authority to the President to fulfill obligations of the United States under the international energy program;

- Provide for the creation of a Strategic Petroleum Reserve capable of reducing the impact of severe energy supply interruptions;

- Conserve energy supplies through energy conservation programs, and the regulation of certain energy uses;

- Provide for improved energy efficiency of motor vehicles, major appliances, and certain other consumer products;

- Provide a means for verification of energy data to assure the reliability of energy data; and,

- Conserve water by improving the water efficiency of certain plumbing products and appliances.

3.3.1.1.2 National Energy Act of 1978

The National Energy Act of 1978 included the following statutes: Public Utilities Regulatory Policies Act of 1978 (PURPA; Public Law 95-617), Energy Tax Act, National Energy Conservation Policy Act (NECPA), Power Plant and Industrial Fuel Use Act, and the National Gas Policy Act. The Power Plant and Industrial Fuel Use Act restricted the fuel used in power plants, however, these restrictions were lifted in 1987. The Energy Tax Act was superseded by the Energy Policy Acts of 1992 (EPACT92) and 2005. The National Gas Policy Act gave the Federal Energy Regulatory Commission authority over natural gas production and established pricing guidelines. NECPA set minimum energy performance standards, which replaced those in EPCA and the federal standards preempted those set by the state. NECPA was amended by the EPCA Amendments of 1985. Of the five statutes, PURPA, is relevant to the consideration of the 2016 AQMP.

3.3.1.1.3 PURPA

PURPA was passed in response to the unstable energy climate of the late 1970s. PURPA sought to promote conservation of electric energy. Additionally, PURPA created a new class of non-utility generators, small power producers, from which, along with qualified co-generators, utilities are required to buy power.

PURPA was in part intended to augment electric utility generation with more efficiently produced electricity and to provide equitable rates to electric consumers. Utility companies are required to buy all electricity from a qualifying facility (QF). PURPA expanded participation of non-utility generators in the electricity market and demonstrated that electricity from non-utility generators could successfully be integrated with a utility's own supply. PURPA requires utilities to buy whatever power is produced by QFs (usually cogeneration or renewable energy). The Fuel Use Act of 1978 (FUA) (repealed in 1987) also helped QFs become established. Under the FUA, utilities were not allowed to use natural gas to fuel new generating technologies, but QFs, which were by definition not utilities, were able to take advantage of abundant natural gas and abundant new technologies (such as combined-cycle).

3.3.1.1.4 EPACT92

EPACT92 is comprised of 27 titles. It was passed by Congress and set goals, created mandates, and amended utility laws to increase clean energy use and improve overall energy efficiency in the United States. EPACT92 established regulations requiring certain federal, state, and alternative fuel provider fleets to build an inventory of alternative fuel vehicles. EPACT92 was amended as part of the Energy Conservation and Reauthorization Act of 1998 and via the Energy Policy Act in 2005 which emphasized alternative fuel use and infrastructure development.

3.3.1.1.5 Energy Policy Act of 2005

The Energy Policy Act of 2005 addresses energy efficiency; renewable energy requirements; oil, natural gas and coal; alternative-fuel use; tribal energy, nuclear security; vehicles and vehicle fuels; hydropower and geothermal energy; and climate change technology. The act provides revised annual energy reduction goals (two percent per year beginning in 2006), revised renewable energy purchase goals, federal procurement of Energy Star or Federal Energy Management Program designated products, federal green building standards, and fuel cell vehicle and hydrogen energy system research and demonstration.

3.3.1.1.6 Clean Air Act (CAA): Renewable Fuel Standard (RFS)

CAA §211 (o), as amended by the Energy Policy Act of 2005, requires the Administrator of the U.S. EPA to annually determine an RFS which is applicable to refiners, importers, and certain blenders of gasoline and publish the standard in the Federal Register by November 30 of each year. On the basis of this standard, each obligated party determines the volume of renewable fuel that it must ensure is consumed as motor vehicle fuel. This standard is calculated as a percentage, by dividing the amount of renewable fuel that the CAA requires to be blended into gasoline for a given year by the amount of gasoline expected to be used during that year, including certain adjustments specified by the CAA.

3.3.1.1.7 Corporate Average Fuel Economy (CAFE) Standards

Compliance with federal fuel economy standards is determined on the basis of each manufacturer's average fuel economy for the portion of their vehicles produced for sale in the United States. The CAFE standards were created to determine vehicle manufacturers' compliance with the fuel economy standards and are administered by the U.S. EPA. The U.S. EPA calculates a CAFE value for each manufacturer based on city and highway fuel economy test results and vehicle sales. Based on the information generated under the CAFE standards, the U.S. DOT is authorized to assess penalties for noncompliance.

3.3.1.1.8 Energy Independence and Security Act of 2007 (EISA)

EISA was signed into law on December 19, 2007. The objectives EISA are to move the United States toward greater energy independence and security, increase the production of clean renewable fuels, protect consumers, increase the efficiency of products, buildings and vehicles, promote greenhouse gas (GHG) research, improve the energy efficiency of the federal government, and improve vehicle fuel economy.

The renewable fuel standard in EISA requires the production of 36 billion gallons of ethanol per year by 2022, with corn-based ethanol limited to 15 billion gallons. The CAFE standard for light duty vehicles is 35 miles per gallon by 2020. EISA also specifies that vehicle attribute-based standards are to be developed separately for cars and light trucks. EISA creates a CAFE credit and transfer program among manufacturers and across a manufacturer's fleet. It would allow an extension through 2019 of the CAFE credits specified under the Alternative Motor Fuels Act. It established appliance energy efficiency standards for boilers, dehumidifiers, dishwashers, clothes washers, external power supplies, commercial walk-in coolers and freezers; federal buildings; lighting energy efficiency standards for general service incandescent lighting in 2012; and standards for industrial electric motor efficiency.

3.3.1.1.9 Moving Ahead for Progress in the 21st Century (MAP-21)

MAP-21 replaced the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) as the nation's surface transportation program and extended the provisions for fiscal year (FY) 12 with new provisions for FY 13. MAP-21 funds surface transportation programs and is intended to create a streamlined, performance-based, and multimodal program to address challenges facing the United States transportation system. These challenges include improving safety, maintaining infrastructure condition, reducing traffic congestion, improving efficiency of the system and freight movement, protecting the environment, and reducing delays in project delivery. MAP-21 addresses economic growth, accessibility, social equity, energy security and public health by setting transparent performance benchmarks.

3.3.1.1.10 Heavy-Duty National Program

The Heavy-Duty National Program was adopted on August 9, 2011, to establish the first fuel efficiency requirements for medium- and heavy-duty vehicles beginning with model year 2014.

3.3.1.1.11 Proposed Phase 2 GHG Emissions Standards (Phase 2) and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles

In June 2015, the U.S. EPA and U.S. DOT's National Highway Traffic Safety Administration (NHTSA) are jointly proposing a national program that would establish GHG and fuel efficiency standards for medium- and heavy-duty vehicles. The Phase 2 standards are expected to reduce fuel consumption and GHG emissions by one billion metric tons; they would begin in model year 2021 and culminate in standards for model year 2027.

3.3.1.2 State Regulations

3.3.1.2.1 California Building Energy Efficiency Standards: Title 24

California established statewide building energy efficiency standards following legislative action. The legislation required the standards to be cost-effective based on the building life cycle and to include both prescriptive and performance-based approaches. The 2005 Building Energy Efficiency Standards were first adopted in November 2003 and took effect October 1, 2005. Subsequently the standards have undergone two updates: 2008 and 2013. The 2013 Building Energy Efficiency Standards went into effect on July 1, 2014. The 2016 standards, which will go into effect on January 1, 2017 and will continue to improve upon the current 2013 Standards for new construction of, and additions and alterations to, residential and nonresidential buildings.

The 2013 standards focus on several key areas to improve the energy efficiency of newly constructed buildings and additions and alterations to existing buildings, and include requirements that will enable both demand reductions during critical peak periods and future solar electric and thermal system installations.

3.3.1.2.2 AB 1007 – Alternative Fuels Plan

The Alternative Fuels Plan adopted in 2007 by the State Energy Resources Conservation and Development Commission and CARB, as required under state law AB 1007, recommends that the Governor set targets on a gasoline gallon equivalent (GGE) basis for ten different alternative motor fuels used in the on- and off-road sectors by nine percent by 2012, 11 percent by 2017, and 26 percent by 2022. These targets do not apply to air, rail, or marine fuel uses. These goals will require a dramatic expansion in the use of such fuels as electricity, compressed natural gas, hydrogen, renewable diesel, bio-diesel, and ethanol in motor vehicles.

Also built into the Alternative Fuels Plan is a multi-part strategy to develop hybrid and electric vehicle technologies; build the infrastructure to deliver the alternative fuels; increase the blending of more biofuels into gasoline and diesel; improve the fuel efficiency of vehicles; and reduce vehicle miles traveled by California motorists with more effective land use planning.

3.3.1.2.3 AB 1493 – Vehicle Climate Change Standards

The Advanced Clean Cars Program under AB 1493 (Pavley I), requires CARB to develop and adopt standards for vehicle manufacturers to reduce GHG emissions coming from passenger vehicles and light-duty trucks at a “maximum feasible and cost effective reduction” by January 1, 2005. Pavley I took effect for model years starting in 2009 to 2016 and Pavley II, which is now referred to as “LEV (Low Emission Vehicle) III GHG” will cover 2017 to 2025. Fleet average emission standards would reach 22 percent reduction by 2012 and 30 percent by 2016.

In January 2012, CARB adopted the Advanced Clean Cars program to extend AB 1493 through model years 2017 to 2025. This program will promote all types of clean fuel technologies such as plug-in hybrids, battery electric vehicles, compressed natural gas (CNG) vehicles, and hydrogen powered vehicles while reducing smog.

3.3.1.2.4 Senate Bill (SB) 1368 – GHG Emissions Performance Standards for Major Power Plant Investments

SB 1368 was passed in September 2006 and requires the CEC to develop and adopt by regulation a GHG emissions performance standard for long-term procurement of electricity by local publicly owned utilities. The CPUC and CEC had adopted specific regulations regarding GHG emissions performance standards for electricity service providers. Compliance with these standards is expected to improve fuel use.

3.3.1.2.5 California Solar Initiative

On January 12, 2006, the CPUC approved the California Solar Initiative (CSI), which provides $2.9 billion in incentives between 2007 and 2017. CSI is part of the Go Solar California campaign, and builds on ten years of state solar rebates offered to areas services by California's Investor-owned utilities (IOU): Pacific Gas & Electric (PG&E), Southern California Edison (SCE), and San Diego Gas & Electric (SDG&E.) The CSI is overseen by the CPUC and includes a $2.5 billion program for commercial and existing residential customers, funded through revenues and collected from gas and electric utility distribution rates. Furthermore, the CEC will manage $350 million targeted for new residential building construction, utilizing funds already allocated to the CEC to foster renewable projects between 2007 and 2011.

Current incentives provide an upfront, capacity-based payment for a new system. In its August 24, 2006 decision, the CPUC shifted the program from volume-based to performance-based incentives and clarified many elements of the program's design and administration. These changes were enacted in 2007.

3.3.1.2.6 Reducing California's Petroleum Dependence

The CEC and CARB produced a joint report "Reducing California's Petroleum Dependence" to highlight petroleum consumption and to establish a performance based goal to reduce petroleum consumption in California over the next thirty years. The report includes the following recommendations to the Governor and Legislature regarding petroleum:

- Adopt the recommended statewide goal of reducing demand for on-road gasoline and diesel to 15 percent below the 2003 demand level by 2020 and maintaining that level for the foreseeable future.

- Work with the California delegation and other states to establish national fuel economy standards that double the fuel efficiency of new cars, light trucks, and sport utility vehicles.

- Establish a goal to increase the use of non-petroleum fuels to 20 percent of on-road fuel consumption by 2020, and 30 percent by 2030.

The CEC will also use these recommendations when developing its series of recommendations to the Governor and Legislature for the integrated energy plan for electricity, natural gas, and transportation fuels.

3.3.1.2.7 AB 2514 – Energy Storage Systems

AB 2514 requires the CPUC to adopt an energy storage system procurement target, if determined to be appropriate, to be achieved by each load-serving entity by December 31, 2015 and a second target to be achieved by December 31, 2020. The bill would require the governing board of a local publicly owned electric utility to adopt an energy storage system procurement target, if determined to be appropriate, to be achieved by that utility by December 31, 2016; second target by December 31, 2021. The bill would require each load-serving entity and local publicly owned electric utility to report certain information to the CPUC (load-serving entity) or to the Energy Commission (local publicly owned electric utility).

3.3.1.2.8 EO B-16-2012

EO B-16-2012 establishes long-term targets of reaching 1.5 million zero-emission vehicles (ZEV) on California's roadways by 2025 and sets ZEV purchasing requirements for state government fleets. EO B-16-2012 also sets a target for 2050 of a reduction of GHG emissions from the transportation sector equaling 80 percent less than 1990 levels. In February 2013, an interagency working group developed the ZEV Action Plan, which identifies specific strategies and actions that state agencies will take to meet the milestones of the EO. The ZEV Action Plan states:

> *ZEVs are crucial to achieving the state's 2050 greenhouse gas goal of 80 percent emission reductions below 1990 levels, as well as meeting federal air quality standards. Achieving 1.5 million ZEVs by 2025 is essential to advance the market and put the state on a path to meet these requirements.*

3.3.1.2.9 Renewables Portfolio Standard (RPS)

California's RPS requires retail sellers of electricity to increase their procurement of eligible renewable energy resources by at least one percent per year so that 20 percent of their retail sales are procured from eligible renewable energy resources by 2017. If a seller falls short in a given year, they must procure more renewables in succeeding years to make up the shortfall. Once a retail seller reaches 20 percent, they need not increase their procurement in succeeding years. RPS was enacted via SB 1078, signed in September 2002. The CEC and the CPUC are jointly implementing the standard. In 2006, RPS was modified by SB 107 to require retail sellers of electricity to reach the 20 percent renewables goal by 2010. In 2011, RPS was further modified by SB 2 to require retailers to reach 33 percent renewable energy by 2020.

3.3.1.2.10 SB 350

SB 350 was approved on October 7, 2015. SB 350 will: (1) increase the standards of the California RPS program by requiring that the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources be increased to 50 percent by December 31, 2030; (2) require the State Energy Resources Conservation and Development Commission to establish annual targets for statewide energy efficiency savings and demand reduction that will achieve a cumulative doubling of statewide energy efficiency savings in electricity and natural gas final end uses of retail customers by January 1, 2030; (3) provide for the evolution of the Independent System Operator (ISO) into a regional organization; and (4) require the state to reimburse local agencies and school districts for certain costs mandated by the state through procedures established by statutory provisions. Among other objectives, the Legislature intends to double the energy efficiency savings in electricity and natural gas final end uses of retail customers through energy efficiency and conservation.

3.3.1.2.11 EO B-18-12

EO B-18-12 was signed into law on April 25, 2012 and directed state agencies to reduce their grid-based energy purchases by at least 20 percent by 2018, as compared to a 2003 baseline. Pursuant to EO B-18-12, all new state buildings and major renovations beginning design after 2025 shall be constructed as Zero Net Energy facilities with an interim target for 50 percent of new facilities beginning design after 2020 to be Zero Net Energy. State agencies shall also take measures toward achieving Zero Net Energy for 50 percent of the square footage of existing state-owned building area by 2025 and reduce water use by 20 percent by 2020. Additionally, the following measures relevant to energy are required:

- Any proposed new or major renovation of state buildings larger than 10,000 square feet shall use clean, on-site power generation, such as solar photovoltaic, solar thermal and wind power generation, and clean back-up power supplies, if economically feasible;

- New or major renovated state buildings and build-to-suit leases larger than 10,000 square feet shall obtain a Leadership in Energy and Environmental Design (LEED) "Silver" certification or higher using the applicable version of LEED;

- New and existing buildings shall incorporate building commissioning to facilitate improved and efficient building operation; and

- State agencies shall identify and pursue opportunities to provide electric vehicle charging stations and accommodate future charging infrastructure demand, at employee parking facilities in new and existing buildings.

3.3.1.2.12 California Environmental Quality Act (CEQA)

Appendix F of the CEQA Guidelines describes the types of information and analyses related to energy conservation that are to be included in Environmental Impact Reports (EIR) that are prepared pursuant to CEQA. Energy conservation is described in Appendix F of the CEQA Guidelines in terms of decreased per capita energy consumption, decreased reliance on natural gas and oil, and increased reliance on renewable energy sources. To assure that energy implications are considered in project decisions, EIRs must include a discussion of the potentially significant energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy.

3.3.1.3 Local Regulations

3.3.1.3.1 Clean Cities Program

The U.S. DOE Clean Cities Program promotes voluntary, locally based government/industry partnerships for the purpose of expanding the use of alternatives to gasoline and diesel fuel by accelerating the deployment of alternative fuel vehicles and building a local alternative fuel vehicle refueling infrastructure. The mission of the Clean Cities Program is to advance the nation's energy security by supporting local decisions to adopt practices that contribute to the reduction of petroleum consumption. Clean Cities carries out this mission through a network of more than 80 volunteer coalitions, which develop public/private partnerships to promote alternative fuels and vehicles, fuel blends, fuel economy, hybrid vehicles, and idle reduction.

3.3.1.3.2 San Gabriel Valley Energy Efficiency Partnership

In April 2006, SCAG's Regional Council authorized SCAG's Executive Director to enter into a partnership with SCE to incentivize energy efficiency programs in the San Gabriel Valley subregion. The San Gabriel Valley Energy Wise Program (SGVEWP) agreement was fully executed on October 20, 2006 with the main goal to save a combined three million kilowatt-hours (kWh) by providing technical assistance and incentive packages to cities by 2008. The program has been extended and seeks to reduce energy usage in the region by approximately five million kWh by 2012. The SGVEWP is funded by California utility customers and administered by SCE under the auspices of the CPUC.

3.3.2 ENERGY TRENDS IN GENERAL

In 2014, 67 percent of the electricity came from in-state sources, while 33 percent was imported into the state. In 2014, the electricity generated in-state totaled 198,973 gigawatt-hours (GWh) while imported electricity totaled 97,870 GWh, with 37,261 GWh (13 percent) coming from the Pacific Northwest and 60,609 GWh (20 percent) coming from the Southwest (CEC, 2015a). For natural gas in 2013, 38 percent came from the Southwest, 16 percent came from Canada, ten percent came from in-state, and 36 percent came from the Rocky Mountains (CEC, 2015b). Also in 2014, 38 percent of the crude oil came from in-state, with ten percent coming from Alaska and 52 percent being supplied by foreign sources (CEC, 2014).

3.3.2.1 Electricity

Power plants in California provided approximately 67 percent of the total in-state electricity demand in 2014 of which 22.5 percent came from renewable sources such as biomass, geothermal, small hydro, solar, and wind. The Pacific Northwest provided another 13 percent of the total electricity demand of which 31 percent came from renewable sources. The Southwest provided 21 percent of the total electricity demand, with six percent coming from renewable sources. In total, approximately 20 percent of the total in-state electricity demand for 2014 came from renewable sources (CEC, 2015a).

Four of the state's largest power plants are located in Basin. The largest power plants in California are located in northern California: the Moss Landing Natural Gas Power Plant (2,484 MW) located in Monterey Bay, Monterey County and the Diablo Canyon Nuclear Plant (2,323 MW) located in

Avila Beach, San Luis Obispo County. The third and fourth largest power plants in California are located inside the Basin: the AES Alamitos Natural Gas Power Generating Station (1,970 MW) in Long Beach, Los Angeles County and the Los Angeles Department of Water and Power (LADWP) Haynes Natural Gas Power Plant (net summer capacity 1,724 MW) also in Long Beach. The fifth and sixth largest power plants in California are located outside of the Basin: the Ormond Beach Natural Gas Power Plant (1,613 MW) in Oxnard, Ventura County and Pittsburg Natural Gas Power Plant (1,370 MW) in Pittsburg, Contra Costa County. The AES Redondo Beach Natural Gas Power Plant (1,343 MW) is the seventh largest power plant followed by the LADWP's Castaic Pump-Storage Power Plant 7 in Castaic (1,331 MW). The ninth and tenth largest power plants in California are also located outside of the Basin: the Helms Pumped Storage Facility (1,212 MW) in the Sierra National Forest portion of Fresno County and La Paloma Generating Project (1,200 MW) in West Elk Hills, Kern County (SCAQMD, 2015).

Local electricity distribution service is provided to customers within Southern California by both IOUs and Publicly Owned Utilities (POU). The two IOUs operating in the region are SCE and SDG&E. SCE is the largest electricity utility in Southern California with a service area that covers all, or nearly all, of Orange, San Bernardino, and Ventura Counties and most of Los Angeles and Riverside Counties. SCE coverage also includes areas outside the Southern California region including Inyo, Tulare, and Mono County as well as portions of Kern, Fresno, and Tuolumne Counties. SDG&E provides local distribution service to the southern portion of Orange County. Also in the region, the Southern California Public Power Authority (SCPPA) members consist of the municipal utilities of Anaheim, Azusa, Banning, Burbank, Cerritos, Colton, Glendale, Los Angeles, Pasadena, Riverside, Vernon, and the Imperial Irrigation District. Together, these municipal utilities deliver electricity to over two million customers in the Southern California region that spans an area of 7,000 square miles and has a total population that exceeds five million. LADWP is the largest of the publicly owned electric utilities in southern California (SCAG, 2016).

Table 3.3-1 shows the amount of electricity delivered in 2014 to residential and non-residential entities in the counties in the Basin.

TABLE 3.3-1

2014 Electricity Use in SCAQMD (GWh)

Sector	Los Angeles	Orange	Riverside	San Bernardino	Total
Residential	20,758	7,035	6,775	4,750	39,318
Non-Residential	49,239	13,688	8,747	9,968	81,642
Total	**69,997**	**20,723**	**15,522**	**14,718**	**120,960**

Source: CEC, 2016h

3.3.2.2 Natural Gas

There are three regions outside the state supplying a combined 90 percent of natural gas consumed in California: the Southwest (38 percent), the Rocky Mountains (36 percent) and Canada (16 percent). The remaining ten percent of natural gas consumed was supplied from within the state (CEC, 2015b).

Southern California Gas Company (SoCalGas), an IOU, provides natural gas service throughout Southern California, except for portions of San Bernardino County and the southern portion of Orange County (SDG&E). In San Bernardino County, Southwest Gas Corporation provides natural gas service to Big Bear and three cities outside the SCAQMD jurisdiction: Victorville, Barstow, and Needles.

LADWP utilizes natural gas for electrical generation in the City of Los Angeles (SCAG, 2016) Electrical generation accounted for about 40 percent of natural gas consumption in California in 2014 (CGR, 2014). Table 3.3-2 provides the estimated use of natural gas in California by residential, commercial and industrial sectors. Table 3.3-3 provides the estimated use of natural gas in the Basin by county.

TABLE 3.3-2

California Natural Gas Demand 2014
(Million Cubic Feet per Day – MMcf/day)

Sector	Utility	Non-Utility	Total
Residential	1,218	--	1,218
Commercial	505	--	505
Natural Gas Vehicles	43	--	43
Industrial	934	--	934
Electric Generation	2,026	466	2,492
Enhanced Oil Recovery (EOR) Steaming	44	497	541
Wholesale / International + Exchange	235	--	235
Company Use and Unaccounted-for	80	--	80
EOR Cogeneration / Industrial	--	128	128
Total	**5,085**	**1,090**	**6,175**

Source: California Gas Report (CGR), 2014
Note: Totals may not equal sum of components due to independent rounding

TABLE 3.3-3

2014 Natural Gas Use in SCAQMD (Millions of Therms)

Sector	Los Angeles	Orange	Riverside	San Bernardino	Total
Residential	1,078.3	319.2	207.3	213.7	1,818.5
Non-Residential	1,779.2	231.0	126.5	237.1	2,373.8
Total	**2,857.5**	**550.2**	**333.8**	**450.8**	**4,192.3**

Source: CEC, 2016n
Note: Totals may not equal sum of components due to independent rounding

3.3.2.3 Liquid Petroleum Fuels

California relies on oil produced within the state, Alaska, and foreign nations to supply its refineries and produce the petroleum that is used in automobiles and for other purposes. The percentage of oil that is imported from foreign nations has increased dramatically over the past 20 years. For example, in 1991, California imported just four percent of oil from foreign sources (30.7 million barrels out of a total of 683.5 million barrels). In 2014, however, California imported 51.6 percent of oil from foreign sources (328 million barrels out of a total of 635.7 million barrels) (CEC, 2014).

As of July 2015, California is currently ranked third among the oil producing states behind Texas and North Dakota, respectively (USEIA, 2015). California also ranked third in the nation in refining capacity as of January 2014, with a combined capacity of almost two million barrels per calendar day from its 18 operable refineries (USEIA, 2015a).

California also ranked first in the consumption of petroleum products used by the transportation sector (USEIA, 2013). Most gasoline and diesel fuel sold in California for on-road motor vehicles is refined in California to meet state-specific formulations required by CARB. Major petroleum refineries in California are concentrated in three counties: Contra Costa County in Northern California, Kern County in Central California, and Los Angeles County in Southern California. In Los Angeles County, petroleum refineries are located mostly in the southern portion of the county. According to the California State Board of Equalization, in FY 14, 14,573,637,973 gallons of gasoline (CSBE, 2014) and 2,741,781,694 gallons of diesel fuel (CSBE, 2014a) were sold in California. The volume of gasoline also includes aviation fuel. Fuel use in the Basin is provided in Table 3.2-9.

3.3.3 ALTERNATIVE CLEAN TRANSPORTATION FUELS

Alternative fuels, as defined by the Energy Policy Act of 1992, include:

- Biodiesel
- Natural Gas
- Electric Vehicles (EVs)
- Ethanol (E85) – Flexible Fuel Vehicles
- Hydrogen & Fuel Cell Vehicles
- Liquefied Natural Gas (LNG)
- Liquefied Petroleum Gas (LPG)
- Neighborhood Electric Vehicles (NEVs)

These fuels are being used worldwide in a variety of vehicle applications. Use of these fuels for transportation can generally reduce air pollutant emissions and can be domestically produced and derived from renewable sources. The Energy Policy Act of 2005 further directed the U.S. DOE to carry out a study to plan for the transition from petroleum to hydrogen in a significant percentage of vehicles sold by 2020. AB 118 (2007) created the CEC's Alternative and Renewable Fuel and Vehicle Technology Program. The statute, subsequently amended by AB 109 (2008), and AB 8 (2013), authorizes the CEC to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the state's climate change policies. The CEC has an annual program budget of approximately $100 million to support projects that develop and improve alternative and renewable low-carbon fuels; optimize alternative and renewable fuels for existing and developing engine technologies; produce alternative and renewable low-carbon fuels in California; decrease, on a full fuel cycle basis, the overall impact and carbon footprint of alternative and renewable fuels and increase sustainability; expand fuel infrastructure, fueling stations, and equipment; improve light-, medium-, and heavy-duty vehicle technologies; retrofit medium- and heavy-duty on-road and non-road vehicle fleets; expand infrastructure connected with existing fleets, public transit, and transportation corridors; establish workforce training programs; conduct public education and promotion; and create technology centers (SCAG, 2106).

There are a growing number of alternative fuel vehicles in California as a result of the joint efforts of the CEC, CARB, local air districts, federal government, transit agencies, utilities, and other public and private entities. There are more than 10,000 EVs on the road as well as more than 61,000 cars, transit buses, and trucks currently operating on natural gas and LPG. Southern California also has hundreds of fueling stations dispensing a variety of non-petroleum fuels (see Table 3.3-4) (CEC, 2015c).

3.3.3.1 Biodiesel

Biodiesel is an alternative fuel produced from renewable resources, such as soybeans or used restaurant grease. Biodiesel contains no petroleum and can be used in diesel engines with no major modifications. Biodiesel is simple to use, biodegradable, non-toxic, and essentially free of sulfur and aromatics. Biodiesel can be used as a pure fuel (neat biodiesel or B100) or as a biodiesel blend with petroleum in any percentage. B20 (a blend of 20 percent by volume biodiesel with 80 percent by volume petroleum diesel), B2, and B5 are common fuel blends (CEC, 2015d).

Biodiesel is registered as a fuel and fuel additive with the U.S. EPA and meets clean diesel standards established by CARB. Biodiesel is the only alternative fuel to have fully completed the health effects testing requirements under the CAA. The use of biodiesel in a conventional diesel engine results in substantial reductions of unburned hydrocarbons, carbon monoxide, and particulate matter compared to emissions from diesel fuel (CEC, 2015d).

TABLE 3.3-4

Alternative Fueling Stations in the Southern California Region

County	Fuel Type	Count
Los Angeles		
	BD	9
	CNG	93
	E85	13
	ELEC	658
	HY	19
	LNG	18
	LPG	90
Orange		
	BD	1
	CNG	30
	E85	9
	ELEC	191
	HY	11
	LNG	2
	LPG	26
Riverside		
	BD	4
	CNG	34
	E85	8
	ELEC	111
	HY	2
	LNG	5
	LPG	17
San Bernardino		
	BD	4
	CNG	24
	E85	6
	ELEC	79
	HY	2
	LNG	8
	LPG	24
Total Count		**1498**

Source: SCAG, 2016

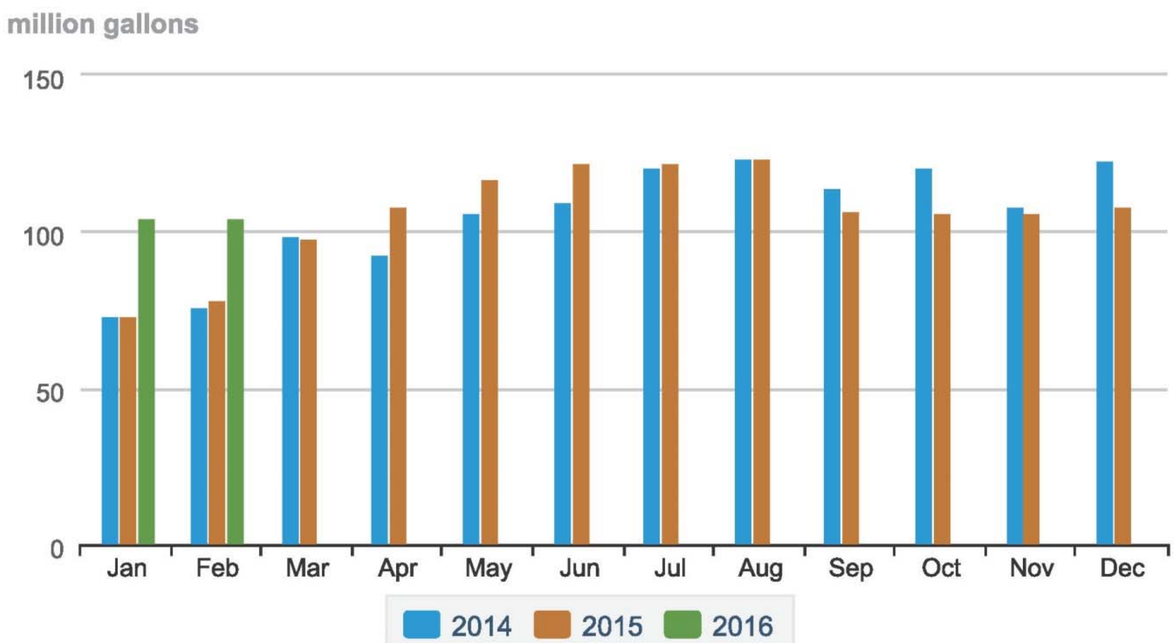
Note: BD = Biodiesel; CNG = Compressed Natural Gas; ELEC = Electric; E85 = Ethanol; HY = Hydrogen; LNG = Liquefied Natural Gas; LPG = Propane

Production of biodiesel in the United States dramatically increased in response to federal legislation that went into effect in 2005 and included a $1 per gallon blending credit for all biodiesel blended with conventional diesel fuel, but declined in 2009 and 2010 with the temporary loss of the subsidy in conjunction with poor production economics (high feedstock costs relative to market price of diesel fuel). Output has rebounded as refiners and other obligated parties strive to meet biodiesel blending requirements mandated by the RFS (CEC, 2013).

United States production of biodiesel was 123 million gallons in August 2015. Biodiesel production during August 2015 was about 2 million gallons higher than production in July 2015. Biodiesel production from the Midwest region was about 70 percent of the United States total. Production came from 101 biodiesel plants with capacity of 2.0 billion gallons per year. Producer sales of biodiesel during August 2015 included 75 million gallons sold as B100 and an additional 46 million gallons of B100 sold in biodiesel blends with diesel fuel derived from petroleum. There were a total of 909 million pounds of feedstocks used to produce biodiesel in August 2015. Soybean oil remained the largest biodiesel feedstock during August 2015 with 464 million pounds consumed. Figure 3.3-1 shows the monthly biodiesel production totals for the U.S. from 2013 – 2015 (USEIA, 2015b).

FIGURE 3.3-1

U.S. Monthly Biodiesel Production 2013 – 2015



Source: (USEIA, 2015b)

Biodiesel use has been gradually increasing over the past few years in California, but there is a potential constraint in securing enough low-carbon intensity feedstock to produce biodiesel and renewable diesel. The bulk of the renewable diesel is produced in Singapore and shipped to California (CEC, 2013). As such, biodiesel use in California is estimated to have been nearly 136 million gallons in 2013.

3.3.3.2 Natural Gas

Natural gas is a mixture of hydrocarbons, mainly methane, and is produced either from gas wells or in conjunction with crude oil production. Compressed natural gas, or CNG, is natural gas under pressure which remains clear, odorless, and non-corrosive. Although vehicles can use natural gas as either a liquid or a gas, most vehicles use the gaseous form compressed to pressures above 3,100 pounds per square inch. Most natural gas comes from three types of wells: natural gas-and-condensate wells, oil wells, and coal bed methane wells. In 2003, California had over 1,200 natural gas-and-condensate wells operating. Well-extracted natural gas requires a cleanup process before it can be used in vehicles or residences. (CEC, 2015e)

More than 99 percent of the natural gas used in the United States comes from domestic or other North American sources. However, increasing demand for natural gas in power plants may require new supplies from non-North American countries. The United States Energy Information Administration (USEIA) predicts that, by 2025, more than 15 percent of the United States natural gas supplies will be imported from countries other than Canada and Mexico. California gas utilities such as PG&E, SoCalGas, and SDG&E, distribute the fuel to customers. Most CNG vehicle fueling stations are owned and operated by private companies and local governments (CEC, 2015e).

Natural gas is produced both worldwide and domestically, and is cleaner burning than gasoline or diesel fuel. Natural gas vehicles show an average reduction in ozone-forming emissions of 80 percent compared to gasoline vehicles. CNG vehicles have been introduced in a wide variety of commercial applications, from light-duty trucks and sedans, (e.g. taxi cabs) to medium-duty trucks, to heavy-duty vehicles like transit buses, street sweepers, and school buses. In California, transit agency buses are some of the most visible CNG vehicles. (CEC, 2015e)

With the consumption of CNG increasing nationwide by 145 percent over the past six years, the fueling infrastructure for natural gas vehicles continues to grow. In 2005, California has more than 200 CNG fueling stations. In Southern California, there are more than 100 public fueling stations in major metropolitan areas from Los Angeles to the Mexican border. Another 50 stations are now under construction (CEC, 2015e).

3.3.3.3 EVs

Electricity can be used as a transportation fuel to power plug-in and fuel cell vehicles. When used to power plug-in electric vehicles or EVs, electricity is stored in an energy storage device such as a battery. Fuel cell vehicles use electricity produced from an electrochemical reaction that takes place when hydrogen and oxygen are combined in the fuel cell "stack." The production of electricity using fuel cells takes place without combustion or pollution and leaves only two byproducts, heat and water.

Electric vehicles have several different charging systems: 120-volt, 240-volt, and direct-current. An electric vehicle that accepts 120-volt power can do so from any standard electrical outlet with a 12- or 16-amp dedicated branch circuit (with no other receptacles or loads on the circuit). A 240-volt system (Level 2 charging station) requires the installation of a home charging station and is available at most public charging stations. Direct-current fast charging equipment (480 volt) provides 50 kW to the battery. Many plug-in vehicle owners will do the majority of their charging at home (or at fleet facilities, in the case of fleets). Some employers offer access to charging at the workplace. In many states, plug-in vehicle drivers also have access to public charging stations at libraries, shopping centers, hospitals, and businesses. Charging infrastructure is expanding, providing drivers with the convenience, range, and confidence to meet more of their transportation needs with plug-in vehicles (SCAG, 2016).

Well-designed EVs can travel at the same speeds as conventional vehicles and provide the same safety and performance capabilities. In some instances, the EVs have better acceleration because of the characteristics of motors at low speeds (CEC, 2015f). The range for EVs, however, is more limited than conventional vehicle ranges and spans from 50 to 130 miles. Variables include the vehicle's weight, engineering, design, type of battery, weather extremes, and the use of heating and air conditioning (CEC, 2015f).

3.3.3.4 Ethanol – Flexible Fuel Vehicles

Ethanol, or ethyl alcohol, is the same alcohol found in alcoholic beverages, but ethanol also makes an effective motor fuel. There have been decades of motor fuel application experience in the United States and other countries with ethanol.

Most ethanol used for fuel is being blended into gasoline at concentrations of five to 10 percent. In California, ethanol has replaced methyl tertiary butyl ether (MTBE) as a gasoline component. More than 95 percent of the gasoline supplied in the state today contains six percent ethanol. There is a small but growing market for E85 fuel (85 percent ethanol and 15 percent gasoline), primarily found in the Midwest corn-producing states, for use in flexible fuel vehicles (FFVs) several million of which have been produced by United States automakers. FFVs are cars and trucks built with special fuel system components designed to be compatible with higher ethanol concentrations allowing them to use any level of ethanol up to E85 (CEC, 2015g). Ethanol is also being used to formulate a blend with diesel fuel, known as "E-Diesel" and as a replacement for leaded aviation gasoline in small aircraft (CEC, 2015g).

Ethanol has a lower energy content than gasoline, meaning that about one-third more ethanol is required to travel the same distance as on gasoline. But other ethanol fuel characteristics, including a high octane rating, result in increased engine efficiency and performance.

The 15 percent gasoline used to formulate E85 is to assure cold weather engine starting and to enhance flame luminosity in case of fire, as burning alcohol does not produce a flame. In low-percentage blends with gasoline, ethanol results in increased vapor pressure, which can be adjusted for in the fuel formulation process and/or controlled with on-board vehicle systems. All gasoline vehicles in use in the U.S. today can accept gasoline blended with up to 10 percent ethanol (sometimes called gasohol).

Today's expanding ethanol fuel industry in the United States uses mostly corn as its basic ingredient. It is processed via fermentation and distillation to produce ethanol, animal feed, and other by-products. Iowa, Illinois, Minnesota, and Nebraska are the largest ethanol-producing states; however, there is some ethanol production in 20 states.

More states and foreign countries are becoming ethanol producers, employing traditional crop feedstocks and processes. In addition, new technologies for producing ethanol from agricultural, forestry, and municipal wastes and residues are the focus of major research and development efforts around the world. Future ethanol production projects are being planned in California using agricultural crops such as sugar cane and, eventually, various waste and residual feedstocks when technologies for processing these materials become commercially available (CEC, 2015g).

Produced renewably from agricultural crops or from recycled wastes and residues, ethanol used as motor fuel offers a way to reduce greenhouse gas emissions from transportation sources. With respect to other motor vehicle emissions, differences between ethanol and gasoline are becoming less significant as new motor vehicles are produced with extremely low emission levels on all fuels. California's replacement of MTBE with ethanol was based on a determination that ethanol presents less of a pollution risk to drinking water sources.

Most of California's current ethanol fuel supply is delivered from the producing states via standard rail tank cars, with some import shipments via marine vessels. It is then stored at fuel terminals and added to gasoline when tank trucks are filled for delivery to fueling stations, where it is stored and dispensed the same as non-ethanol gasoline.

E85 dispensers require use of upgraded materials compatible with ethanol's chemical properties. Also, due to certain ethanol properties, fuel transport pipelines in the United States do not currently ship ethanol or gasoline containing ethanol, although experience in Brazil and elsewhere indicates that pipeline shipment can be feasible. To prevent diversion for human consumption, federal regulations require ethanol produced for fuel use to have a denaturant (usually gasoline) added before shipping (CEC, 2015g).

3.3.3.5 Hydrogen

Hydrogen gas is the simplest and lightest fuel. Hydrogen is in a gaseous state at atmospheric pressure and ambient temperatures. Hydrogen is being explored for use in combustion engines and fuel cell electric vehicles. The ability to create hydrogen from a variety of sources (water, hydrocarbons, and other organic matter) and its clean-burning properties make it a desirable alternative fuel. One of the challenges of using hydrogen as fuel comes from being able to efficiently extract hydrogen from these compounds. Although there is no significant transportation distribution system currently for hydrogen transportation use, hydrogen could be transported and delivered using the established hydrogen infrastructure, for significant market penetration, the infrastructure will need further development.

California is leading the nation in hydrogen fueling stations for fuel cell vehicles. By the end of 2015, there should be more than 50 public stations available fuel cell vehicles. Vehicle manufacturers are beginning to offer fuel cell vehicles to consumers who live in regions where these hydrogen stations exist (SCAG, 2016).

3.3.3.6 Liquefied Natural Gas (LNG)

Liquefied natural gas, or LNG, is natural gas in a liquid form that is clear, colorless, odorless, non-corrosive, and non-toxic. LNG is produced when natural gas is cooled to minus 259°F through a process known as liquefaction. During this process, the natural gas, which is primarily methane, is cooled below its boiling point, whereby certain concentrations of hydrocarbons, water, carbon dioxide, oxygen, and some sulfur compounds are either reduced or removed. LNG is also less than half the weight of water, so it will float if spilled on water (CEC, 2015i).

A majority of the world's supply comes from countries with the largest natural gas reserves: Algeria, Australia, Brunei, Indonesia, Libya, Malaysia, Nigeria, Oman, Qatar, Trinidad and Tobago. LNG is transported in double-hulled ships specifically designed to handle the low temperature of LNG. These carriers are insulated to limit the amount of LNG that evaporates. LNG carriers are up to 1,000 feet long and require a minimum water depth of 40 feet when fully loaded. In 2004, there were approximately 140 LNG ships operating worldwide (CEC, 2015i).

Benefits of LNG in transportation applications:

- LNG is produced both worldwide and domestically at a relatively low cost and is cleaner burning than diesel fuel. Since LNG has a higher storage density, it is a more viable alternative to diesel fuel than compressed natural gas for heavy-duty vehicle applications.

- In addition, LNG in heavy-duty natural gas engines achieves significantly lower NOx and particulate emission levels than diesel.

Because of LNG's increased driving range, it is used in heavy-duty vehicles, typically vehicles that are classified as "Class 8" (33,000 - 80,000 pounds, gross vehicle weight). Typical transportation applications are refuse haulers, local delivery (grocery trucks), and transit buses (CEC, 2015i).

3.3.3.7 Liquefied Petroleum Gas (LPG)

Liquefied Petroleum Gas (LPG), is produced as part of natural gas processing and crude oil refining. In natural gas processing, the heavier hydrocarbons that naturally accompany natural gas, such as LPG, butane, ethane, and pentane, are removed prior to the natural gas entering the pipeline distribution system. In crude oil refining, LPG is the first product that results at the start of the refining process and is therefore always produced when crude oil is refined (CEC, 2015j).

Propane is a gas that can be turned into a liquid at a moderate pressure, 160 pounds per square inch (psi), and is stored in pressure tanks at about 200 psi at 100°F. When propane is drawn from a tank, it changes to a gas before it is burned in an engine. Propane has been used as a transportation fuel since 1912 and is the third most commonly used fuel in the United States, behind gasoline and diesel. More than four million vehicles fueled by propane are in use around the world in light-, medium-, and heavy-duty applications. Propane holds approximately 86 percent of the energy of gasoline and so requires more storage volume to drive a range equivalent to gasoline, but it is price-competitive on a cents-per-mile-driven basis (CEC, 2015j).

LPG has a long and varied history in transportation applications. It has been used in rural and farming settings since its inception as a motor vehicle fuel.

Over time, propane has been used in several niche applications such as for forklifts, both inside and outside warehouses, and at construction sites. Use of propane can result in lower vehicle maintenance costs, lower emissions, and fuel costs savings when compared to conventional gasoline and diesel. Presently, domestic automakers have reduced their offerings of vehicles that can operate using propane and other gaseous fuels; this has placed renewed emphasis for the conversion or "upfitting" of new vehicles to operate on propane and compressed natural gas.

Vehicle conversions in the 1970s started a very large upswing in the numbers of vehicles capable of using propane, as rising gasoline prices compelled drivers to find more economical fuel sources. The propane industry is once again focused on the conversion or upfitting of vehicles, to maintain the fuel as a viable motor fuel alternative that can provide both emission and petroleum displacement benefits, in the absence of original engine manufacturer (OEM) offerings (CEC, 2015j).

Approximately 1,200 facilities in California dispense propane. Nearly all of these facilities are used primarily to fuel residential and commercial applications such as heaters, recreational vehicles and barbecues. About half of all these facilities are capable of providing propane as a motor fuel, though only about 3 percent of all the fuel dispensed is used for transportation applications.

Since 2000, the state fleet is operating in daily use nearly 1,600 bi-fuel (vehicles that can operation on either gasoline or LPG) Ford F-150 pickup trucks. The potential use of LPG in those vehicles constitutes the largest petroleum displacement for the state fleet; it could displace approximately 4.4 percent of the total fleet fuel use, if these vehicles were exclusively operated on LPG (CEC, 2015j).

Accordingly, the CEC and the U. S. DOE have provided funding to establish 25 LPG stations across the state. These stations are situated for convenient use by Caltrans, the Department of Water Resources (DWR), and the public. The LPG stations, operated by CleanFuel USA and Delta Liquid Energy, are similar to gasoline filling stations: they have dispensers on the fueling island, use fleet fueling cards or credit cards, and offer fuel that is priced competitively with gasoline or diesel on a fuel equivalency basis.

Propane is a low-emission, economic and easily used fuel that can play an important role as an alternative, non-petroleum fuel for our state and the nation. Given the right conditions and incentives, propane can steadily displace a growing volume of petroleum fuels in California and therefore help provide a broader, more competitive transportation fuel market in the state (CEC, 2015j).

As shown in Table 3.2-9, approximately 182 million gallons of LPG were consumed in the Basin in 2012. Of the LPG consumed, approximately 64 percent was consumed by the residential sector, 24 percent was consumed by the commercial sector, and 12 percent was consumed by the industrial sector (see Table 3.2-9 and the 2016 AQMP).

3.3.3.8 Neighborhood Electric Vehicles (NEVs)

Neighborhood Electric Vehicles (NEVs) are one-to four-passenger, three- or four-wheeled vehicles that, when empty, weigh 2,200 pounds or less. They are designed for low-speed use in neighborhoods and urban areas, to run errands, commute to and from work or school, and to make small local deliveries. Because NEVs are limited in their application, a federal standard was created classifying NEVs as low-speed vehicles (CEC, 2015k).

According to this standard, low-speed vehicles are four-wheeled vehicles that can travel no faster than 25 miles per hour. California's Vehicle Codes limit these vehicles to operation on streets with posted speed limits of 35 mph or less.

Some of the major auto companies have begun to develop NEVs that can travel up to 55 mph. This may appeal to some consumers who may need to occasionally travel freeways.

A major demonstration of NEVs - called "Station Cars" - was completed in 1999 in the San Francisco Bay Area. About 70 commuters used small battery-powered electric cars between home and mass transit stations, or between mass transit stations and workplaces. They also used the vehicles for errands during the day or for short trips evening and weekends (CEC, 2105k).

Station cars might become an integrated, mobility system, providing electric vehicles for trips to mass transit and other stations. A station could be at any point that requires high and regular access such as a college campus, a business park, an airport, or a dense residential area.

Besides operating as station cars, NEVs can be used in other places as well. In Palm Springs, California, NEVs are used as police patrol cars in enclosed neighborhoods. Plans are also underway to incorporate NEVs as part of Palm Springs' local government fleet (CEC, 2105k).

3.3.4 RENEWABLE ENERGY

Renewable energy is energy that comes from sources that regenerate and can be sustained indefinitely, unlike fossil fuels, which are exhaustible. The five most common renewable sources are biomass, hydropower, geothermal, wind, and solar. Unlike fossil fuels, non-biomass renewable sources of energy do not directly emit greenhouse gasses. The use of renewable fuels is expected to continue to grow over the next 30 years, although projections show that reliance on non-renewable fuels to meet most energy needs will continue.

In 2014, consumption of renewable resources in the United States totaled about 9.6 quadrillion British thermal units (Btu) or about 10 percent of all energy used nationally (USEIA, 2014a). About 13 percent of U.S. electricity was generated from renewable resources in 2014 (USEIA, 2014b). In 2014, 20 percent of all electricity came from renewable resources in California (CEC, 2015a).

The RPS requires investor-owned utilities, electric service providers, and community choice aggregators regulated by the CPUC to procure 33 percent of retail sales per year from eligible renewable sources by 2020. CPUC issues quarterly renewable energy progress reports to the state Legislature. The quarterly reports focus on California's three large investor-owned utilities: PG&E, SCE, and SDG&E. These investor-owned utilities currently provide approximately 68 percent of the state's electric retail sales. On April 1, 2014, the large investor owned utilities reported in their 33 percent RPS Procurement Progress Reports that they served 20.9 percent of their retail electric load with RPS-eligible electricity during the first compliance period from 2011 to 2013 (CPUC, 2014).

3.3.4.1 Hydroelectric Power

Hydroelectric power, or hydropower, is generated when hydraulic turbines connected to electrical generators are turned by the force of flowing or falling water. In 2014, hydroelectric-produced electricity used by California totaled 14,052 GWh or 7.1 percent of the total system power. In-state production accounted for around 86 percent of all hydroelectricity, while imports from other states totaled 14 percent (CEC, 2015a).

California has 287 hydrogeneration plants, which are mostly located in the eastern mountain ranges and have a total dependable capacity of about 21,000 MW (CEC, 2016). The larger hydro plants located on dams in California (such as Shasta, Folsom, Oroville, etc.) are operated by the U.S. Bureau of Reclamation and the DWR (CEC, 2016a).

In 2014, California's in-state hydroelectric generation continued its multiyear decline due to ongoing drought conditions, dropping 32 percent (7,619 GWh) from 2013 generation levels and 61 percent since 2011, the last "wet" year in California. These declines were directly due to multi-year dry weather conditions impacting the state, especially snowpack accumulations. With below average annual precipitation for 2014, the precipitation deficits from previous years along with record setting warm weather kept California in serious drought conditions. California's annual precipitation was very low by the end of 2014 resulting in low hydroelectric availability for 2014 (CEC, 2015a).

3.3.4.2 Geothermal Energy

Geothermal energy technologies use the clean, sustainable heat from the Earth. Geothermal resources include the heat retained in shallow ground, hot water and rock found a few miles beneath the Earth's surface, and extremely high-temperature molten rock, also known as magma, located deep in the Earth. Geothermal energy can be used to generate electricity or used directly in many commercial and industrial applications.

Heat from the earth—geothermal energy—heats water that has seeped into underground reservoirs. These reservoirs can be tapped for a variety of uses, depending on the temperature of the water. The energy from high-temperature reservoirs (225°-600°F) can be used to produce electricity. The most common type of geothermal power plant, flash steam plants use water at temperatures of more than 360ºF. As this hot water flows up through wells in the ground, the decrease in pressure causes some of the water to boil into steam. The steam is then used to power a generator, and any leftover water and condensed steam is returned to the reservoir. Binary cycle plants use the heat from lower-temperature reservoirs (225°-360°F) to boil a working fluid, which is then vaporized in a heat exchanger and used to power a generator. The water, which never comes into direct contact with the working fluid, is then injected back into the ground to be reheated (USDOE, 2013).

The most developed of the high-temperature resource areas of the state is the Geysers. North of San Francisco, the Geysers were first tapped as a geothermal resource to generate electricity in 1960. It is one of only two locations in the world where a high-temperature, dry steam is found that can be directly used to turn turbines and generate electricity. Dry steam does not create condensation, which damages steam turbine blades. Other major geothermal locations in the state include the Imperial Valley area east of San Diego and the Coso Hot Springs area near Bakersfield.

Due to its location on the Pacific's "Ring of Fire" and because of tectonic plate conjunctions, California contains the largest amount of geothermal electric generation capacity in the United States. In 2015, geothermal energy in California produced 11,994 GWh of electricity. Combined with another 700 GWh of imported geothermal power, geothermal energy produced 6.13 percent of the state's total system power. There are a total of 44 operating geothermal power plants in California with an installed capacity of 2,716 MW (CEC, 2016b).

46 of California's 58 counties have lower temperature resources for direct-use geothermal. In fact, the City of San Bernardino has developed one of the largest geothermal direct-use projects in North America, heating at least three dozen buildings, including a 15-story high-rise and government facilities, with fluids distributed through 15 miles of pipelines (CEC, 2016c).

3.3.4.3 Biomass Electricity

Biomass technologies break down organic matter to release stored energy from the sun. There are many types of biomass—organic matter such as plants, residue from agriculture and forestry, and the organic component of municipal and industrial wastes—that can now be used to produce fuels, chemicals, and power. Wood has been used to provide heat for thousands of years. According to the U.S. EIA, 53 percent of all renewable energy consumed in the United States was biomass-based in 2007 (USDOE, 2016a). Biopower is the production of electricity or heat from biomass resources by technologies including direct combustion, co-firing, and anaerobic digestion.

3.3.4.3.1 Direct Combustion

Direct combustion using conventional boilers is the most common method of producing electricity from biomass. Boilers primarily burn waste wood products from the agriculture and wood-processing industries to produce steam that spins a turbine connected to a generator to produce electricity. Municipal solid waste power plants use direct combustion to create electricity through three methods:

- Mass Burn: Sorted municipal refuse is fed into a hopper to feed a boiler. The heat from the combustion process is used to turn water into steam to power a turbine-generator.

- Refuse-Derived Fuel: Pelletized or fluff municipal refuse, which comes from a by-product of a resource recovery operation where non-combustible materials are removed, are used to feed a boiler. The heat from the combustion process is used to turn water into steam to power a turbine generator.

- Pyrolysis/Thermal Gasification: Related technologies where thermal decomposition of organic material at elevated temperatures with little (Thermal Gasification) to no (Pyrolysis) oxygen or air produces combustible gases. The gases are combusted to produce heat and turn water into steam to power a turbine-generator.

3.3.4.3.2 Co-Firing

Co-firing involves replacing a portion of the petroleum-based fuel in high-efficiency coal-fired boilers with biomass. Co-firing has been successfully demonstrated in most boiler technologies, including pulverized coal, cyclone, fluidized bed, and spreader stoker units. Co-firing biomass can significantly reduce the sulfur dioxide emissions of coal-fired power plants and is a least-cost renewable energy option for many power producers.

3.3.4.3.3 Anaerobic Digestion

Anaerobic digestion, or methane recovery, is a common technology used to convert organic waste to electricity or heat. In anaerobic digestion, organic matter is decomposed by bacteria in the absence of oxygen to produce methane and other byproducts that form a renewable natural gas.

The Los Angeles County Sanitation District (LACSD) operates three Solar Mars gas turbines in Carson, each rated for a gross output of 9.9 MW. These turbines exhaust into heat recovery steam generators for production of steam that is used for digester heating and/or the production of electricity with a steam turbine (LACSD, 2016). Additionally, the LACSD operates landfill gas-to-energy facilities at the Calabasas Landfill (7 MW), Puente Hills Landfill (46 MW), and the Spadra Landfill (5 MW) in Walnut to produce approximately 58 MW (LACSD, 2016a).

At Royal Farms No. 1 in Tulare, California, hog manure is slurried and sent to a Hypalon-covered lagoon for biogas generation. The collected biogas fuels a 70 kilowatt (kW) engine-generator and a 100 kW engine-generator. The electricity generated on the farm is able to meet monthly electric and heat energy demand (CEC, 2016d).

Three other swine farms (Sharp Ranch, Fresno, and Prison Farm) have also installed floating covers on lagoons. The Knudsen and Sons project in Chico, California treated wastewater which contained organic matter from fruit crushing and wash down in a covered and lined lagoon. The biogas produce is burned in a boiler. And at Langerwerf Dairy in Durham, California, cow manure is scraped and fed into a plug flow digester. The biogas produced is used to fire an 85 kW gas engine. The engine operates at 35 kW capacity level and drives a generator to produce electricity. Electricity and heat generated is able to offset all dairy energy demand. The system has been in operation since 1982 (CEC, 2016d).

3.3.4.4 Wind Power

Wind power plants are turbines which use the energy in the motion of the wind to make mechanical energy, which is then converted to electrical energy. In 2015, wind energy generated within California totaled 11,856 GWh or 6.06 percent of the in-state total power generation. Current operating wind energy power plants in California have an installed capacity of about 6,288 megawatts (CEC, 2016e). More than 13,000 of California's wind turbines, or 95 percent of all of California's wind generating capacity and output, are located in three primary regions: Altamont Pass, Tehachapi, and San Gorgonio.

The components of a utility-scale "wind farm" include wind turbines, an underground power transmission system, control and maintenance facilities, and a substation that connects the farm with the utility power grid. Utility-scale wind turbines are classified by size as follows: small (less than 50 kW); intermediate (50 to 500 kW); and large (above 500 kW). Small and intermediate turbines make up the bulk of the older installed turbine base, but new turbines installed in the late 1990s are generally 600 kW and larger (CEC, 2016f).

Utility-scale wind farms are generally located in areas with average annual wind speeds of at least 13 miles per hour. Wind power is more available during certain seasons because climatic conditions affect wind speed. In California, wind speeds are highest in the hot summer months, and approximately three-fourths of all annual wind power output is produced during the spring and summer (CEC, 2016f). While the power produced by many of California's older wind turbines is not cost-competitive with other forms of electricity generation, some of the newest wind turbine designs may be able to match or beat the power prices from many coal and nuclear plants (CEC, 2016f).

3.3.4.5 Solar

Solar electricity production in California falls into two categories - solar thermal, using the concentrated heat of sunlight to heat a fluid to make steam to turn a traditional turbine and generator making electricity; and solar photovoltaic (PV), the direct conversion of sunlight into electricity. Additionally, the heat from the sun is used in solar thermal systems for hot water in homes and businesses and in heating swimming pools. Most electricity from PV is not counted into the total electricity production of the utility companies as the solar panels are mounted on individual homes or businesses (CEC, 2016g).

3.3.4.5.1 PV Cells

PV materials and devices convert sunlight into electrical energy. PV cells are electricity-producing devices made of semiconductor materials coming in many sizes and shapes, often connect together to form PV systems. When light shines on a PV cell, the energy of absorbed light transfers to electrons in the atoms of the PV cell causing electrons to escape from their normal positions in the atoms and become part of the electric flow, or current, in an electrical circuit. While small PV systems can provide electricity for homes, businesses, and remote power needs, larger PV systems provide much more electricity for contribution to the electric power grid.

A single PV device is known as a cell. An individual PV cell is usually small, typically producing about one or two watts of power. To boost the power output of PV cells, they are connected together in chains to form larger units known as modules or panels. Modules can be used individually, or several can be connected to form arrays. One or more arrays are then connected to the electrical grid as part of a complete PV system. Because of this modular structure, PV systems can be built to meet almost any electric power need, small or large (USDOE, 2016c).

The largest PV systems in the country are located in California and produce power for utilities to distribute to their customers. The Solar Star PV power station produces 579 MW of electricity, while the Topaz Solar Farm and Desert Sunlight Solar Farm each produce 550 MW (USDOE, 2016c). California's cumulative installed capacity of PV systems in 1998 was 6.3 MW. In 2015, the capacity of PV systems reached about 5,458 MW, netting 12,507 GWh of electricity (CEC, 2016g). In 2014, the average Californian resident consumed 562 KWh per month (USEIA 2015c) or 6,744KWh per year. Thus, in 2015, PV systems provided enough energy to supply approximately 1.85 million people at 2014 rates of consumption.

3.3.4.5.2 Solar Thermal Energy (STE)

STE is the technology for converting the sun's energy into thermal energy (heat) through solar thermal collectors. The USEIA classifies solar thermal collectors into three categories:

- Low-temperature: Flat plate collectors are used to warm homes, buildings, and swimming pools.
- Medium-temperature: Flat plate collectors are used to heat water or air for residential and commercial uses.
- High-temperature: Mirrors or lenses are used to concentrate STE for electric power production.

Low and medium-temperature collectors can be further classified as either passive or active heating systems. In a passive system, air is circulated past a solar heat surface and through the building by convection (meaning that less dense warm air tends to rise while denser cool air moves downward). No mechanical equipment is needed for passive solar heating. Active heating systems require a collector to absorb and collect solar radiation. Fans or pumps are used to circulate the heated air or heat absorbing fluid. Active systems often include some type of energy storage system.

High-temperature systems used in solar thermal power plants use the sun's rays to heat a fluid to very high temperatures through the use of mirrors or lenses. The fluid is then circulated through pipes so it can transfer its heat to water to produce steam. The steam, in turn, is converted into mechanical energy in a turbine and into electricity by a conventional generator coupled to the turbine.

Solar thermal facilities are concentrated in the desert areas of the state in the Mojave area. In 2015, Solar thermal power plants produced electricity in California totaling 14,953 GWh or 7.64 percent of the state's total electricity production (CEC, 2016g).

Prior to the RPS in 2002, 13 solar thermal power projects were planned in California, with 11 of those filing applications with the CEC. Nine projects, totaling 354 MW, were built. Approximately 4,500 MW of solar thermal is in the license review process (CEC, 2016g).

3.4 HAZARDS AND HAZARDOUS MATERIALS

3.4.1 INTRODUCTION

The goal of the 2016 AQMP is to address the federal 2008 8-hour ozone standard, the 2012 annual PM2.5 standard, and the 2006 24-hour PM2.5 standard, to satisfy the planning requirements of the federal CAA, and to provide an update on the strategy to meet the 1997 8-hour ozone NAAQS and 1979 1-hour ozone NAAQS. The 2016 AQMP also provides a preliminary evaluation of the 2015 federal 8-hour ozone standard. Some of the proposed control measures intended to improve overall air quality may have direct or indirect hazards associated with their implementation. Hazard concerns are related to the potential for fires, explosions or the release of hazardous materials/substances in the event of an accident or upset conditions.

The potential for hazards exist in the production, use, storage, and transportation of hazardous materials. Hazardous materials may be found at industrial production and processing facilities. Some facilities produce hazardous materials as their end product, while others use such materials as an input to their production process. Examples of hazardous materials used as consumer products include gasoline, solvents, and coatings/paints. Hazardous materials are stored at facilities that produce such materials and at facilities where hazardous materials are a part of the production process. Specifically, storage refers to the bulk handling of hazardous materials before and after they are transported to the general geographical area of use. Currently, hazardous materials are transported throughout the Basin in large quantities via all modes of transportation including rail, highway, water, air, and pipeline.

The NOP/IS for the 2016 AQMP identified the use of reformulated fuels, potential exposure to toxic air contaminants, flammability of reformulated products, add-on control devices (e.g., SCRs and catalysts), use of alternative fuels and fuel additives as possibly increasing the potential for hazards, and potential impacts associated with the application of acidifier sodium bisulfate (SBS) to control ammonia emissions from manure.

3.4.2 HAZARDOUS MATERIALS REGULATIONS

Incidents of harm to human health and the environment associated with hazardous materials have created a public awareness of the potential for adverse effects from careless handling and/or use of these substances. As a result, a number of federal, state, and local laws have been enacted to regulate the use, storage, transportation, and management of hazardous materials and wastes. The most relevant hazardous materials laws and regulations are summarized in the following subsection of this section.

3.4.2.1 Definitions

A number of properties may cause a substance to be hazardous, including toxicity, ignitability, corrosivity, and reactivity. The term "hazardous material" is defined in different ways for different regulatory programs. For the purposes of this Program EIR, the term "hazardous materials" refers to both hazardous materials and hazardous wastes. A hazardous material is defined as hazardous if it appears on a list of hazardous materials prepared by a federal, state, or local regulatory agency or if it has characteristics defined as hazardous by such an agency. The (H&S) §25501(k) defines hazardous material as follows:

> "Hazardous material" means any material that because of its quantity, concentrations, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. "Hazardous materials" include but are not limited to hazardous substances, hazardous waste, and any material which a handler or the administering agency has a reasonable basis for believing would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

Examples of the types of materials and wastes considered hazardous are hazardous chemicals (e.g., toxic, ignitable, corrosive, and reactive materials), radioactive materials, and medical (infectious) waste. The characteristics of toxicity, ignitability, corrosivity, and reactivity are defined in Title 22, CCR, §66261.20-66261.24 and are summarized below:

Toxic Substances: Toxic substances may cause short-term or long-lasting health effects, ranging from temporary effects to permanent disability, or even death. For example, such substances can cause disorientation, acute allergic reactions, asphyxiation, skin irritation, or other adverse health effects if human exposure exceeds certain levels. (The level depends on the substances involved and are chemical-specific.) Carcinogens (substances that can cause cancer) are a special class of toxic substances. Examples of toxic substances include benzene (a component of gasoline and a suspected carcinogen) and methylene chloride (a common laboratory solvent and a suspected carcinogen).

Ignitable Substances: Ignitable substances are hazardous because of their ability to burn. Gasoline, hexane, and natural gas are examples of ignitable substances.

Corrosive Materials: Corrosive materials can cause severe burns. Corrosives include strong acids and bases such as sodium hydroxide (lye) or sulfuric acid (battery acid).

Reactive Materials: Reactive materials may cause explosions or generate toxic gases. Explosives, pure sodium or potassium metals (which react violently with water), and cyanides are examples of reactive materials.

3.4.2.2 Federal Regulations

The U.S. EPA is the primary federal agency charged with protecting human health and with safeguarding the natural environment from pollution into air, water, and land. The U.S. EPA works to develop and enforce regulations that implement environmental laws enacted by Congress. The U.S. EPA is responsible for researching and setting national standards for a variety of environmental programs, and delegates to states and Indian tribes the responsibility for issuing permits and for monitoring and enforcing compliance. Since 1970, Congress has enacted numerous environmental laws that pertain to hazardous materials, for the U.S. EPA to implement as well as to other agencies at the federal, state and local level, as described in the following subsections.

3.4.2.2.1 Toxic Substances Control Act

The Toxic Substances Control Act (TSCA) was enacted by Congress in 1976 (see 15 U.S.C. §2601 et seq.) and gave the U.S. EPA the authority to protect the public from unreasonable risk of injury to health or the environment by regulating the manufacture, sale, and use of chemicals currently produced or imported into the United States. The TSCA, however, does not address wastes produced as byproducts of manufacturing. The types of chemicals regulated by the act fall into two categories: existing and new. New chemicals are defined as "any chemical substance which is not included in the chemical substance list compiled and published under [TSCA] section 8(b)." This list included all of chemical substances manufactured or imported into the United States prior to December 1979. Existing chemicals include any chemical currently listed under section 8 (b). The distinction between existing and new chemicals is necessary as the act regulates each category of chemicals in different ways. The U.S. EPA repeatedly screens both new and existing chemicals and can require reporting or testing of those that may pose an environmental or human-health hazard. The U.S. EPA can ban the manufacture and import of those chemicals that pose an unreasonable risk.

3.4.2.2.2 Emergency Planning and Community Right-to-Know Act

The Emergency Planning and Community Right-to-Know Act (EPCRA) is a federal law adopted by Congress in 1986 that is designed to help communities plan for emergencies involving hazardous substances. EPCRA establishes requirements for federal, state and local governments, Indian tribes, and industry regarding emergency planning and "Community Right-to-Know" reporting on hazardous and toxic chemicals. The Community Right-to-Know provisions help increase the public's knowledge and access to information on chemicals at individual facilities, their uses, and releases into the environment. States and communities, working with facilities, can use the information to improve chemical safety and protect public health and the environment. There are four major provisions of EPCRA:

1. Emergency Planning (§§301 – 303) requires local governments to prepare chemical emergency response plans, and to review plans at least annually. These sections also require state governments to oversee and coordinate local planning efforts. Facilities that maintain Extremely Hazardous Substances (EHS) on-site (see 40 CFR Part 355 for the list of EHS chemicals) in quantities greater than corresponding "Threshold Planning Quantities" must cooperate in the preparation of the emergency plan.

2. Emergency Release Notification (§304) requires facilities to immediately report accidental releases of EHS chemicals and hazardous substances in quantities greater than corresponding Reportable Quantities (RQs) as defined under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) to state and local officials. Information about accidental chemical releases must be made available to the public.

3. Hazardous Chemical Storage Reporting (§§311 – 312) requires facilities that manufacture, process, or store designated hazardous chemicals to make Safety Data Sheets (SDSs, formerly referred to as material safety data sheets or MSDSs) describing the properties and health effects of these chemicals available to state and local officials and local fire departments. These sections also require facilities to report to state and local officials and local fire departments, inventories of all on-site chemicals for which SDSs exist. Lastly, information about chemical inventories at facilities and SDSs must be available to the public.

4. Toxic Chemical Release Inventory (§313) requires facilities to annually complete and submit a Toxic Chemical Release Inventory Form for each Toxic Release Inventory (TRI) chemical that are manufactured or otherwise used above the applicable threshold quantities.

Implementation of EPCRA has been delegated to the State of California. The California Emergency Management Agency requires facilities to develop a Hazardous Materials Business Plan if they handle hazardous materials in quantities equal to or greater than 55 gallons, 500 pounds, or 200 cubic feet of gas or extremely hazardous substances above the threshold planning quantity. The Hazardous Materials Business Plan is provided to state and local emergency response agencies and includes inventories of hazardous materials, an emergency plan, and implements a training program for employees.

3.4.2.2.3 Hazardous Materials Transportation Act

The Hazardous Material Transportation Act (HMTA), adopted in 1975 (see 49 U.S.C. §§5101 – 5127), gave the Secretary of Transportation the regulatory and enforcement authority to provide adequate protection against the risks to life and property inherent in the transportation of hazardous material in commerce. The United States Department of Transportation (U.S. DOT) (see 49 CFR Parts 171-180) oversees the movement of hazardous materials at the federal level. The HMTA requires that carriers report accidental releases of hazardous materials to U.S. DOT at the earliest practical moment. Other incidents that must be reported include deaths, injuries requiring hospitalization, and property damage exceeding $50,000. The hazardous material regulations also contain emergency response provisions which include incident reporting requirements. Reports of major incidents go to the National Response Center, which in turn is linked with CHEMTREC, a public service hotline established by the chemical manufacturing industry for emergency responders to obtain information and assistance for emergency incidents involving chemicals and hazardous materials.

Hazardous materials regulations are implemented by the Research and Special Programs Administration (RSPA) branch of the U.S. DOT. The regulations cover the definition and classification of hazardous materials, communication of hazards to workers and the public, packaging and labeling requirements, operational rules for shippers, and training. These regulations apply to interstate, intrastate, and foreign commerce by air, rail, ships, and motor vehicles, and also cover hazardous waste shipments. The Federal Aviation Administration Office of Hazardous Materials Safety is responsible for overseeing the safe handling of hazardous materials aboard aircraft. The Federal Railroad Administration oversees the transportation of hazardous materials by rail. The U.S. Coast Guard regulates the bulk transport of hazardous materials by sea. The Federal Highway Administration (FHWA) is responsible for highway routing of hazardous materials and issuing highway safety permits.

3.4.2.2.4 Hazardous Materials and Waste Regulations

Resource Conservation and Recovery Act: The Resource Conservation and Recovery Act (RCRA) of 1976 authorizes the U.S. EPA to control the generation, transportation, treatment, storage, and disposal of hazardous waste. Under RCRA regulations, hazardous wastes must be tracked from the time of generation to the point of disposal. In 1984, RCRA was amended with addition of the Hazardous and Solid Waste Amendments, which authorized increased enforcement by the U.S. EPA, stricter hazardous waste standards, and a comprehensive underground storage tank program. Likewise, the Hazardous and Solid Waste Amendments focused on waste reduction and corrective action for hazardous releases. The use of certain techniques for the disposal of some hazardous wastes was specifically prohibited by the Hazardous and Solid Waste Amendments. Individual states may implement their own hazardous waste programs under RCRA, with approval by the U.S. EPA. California has been delegated authority to operate its own hazardous waste management program.

CERCLA: CERCLA, which is often commonly referred to as Superfund, is a federal statute that was enacted in 1980 to address abandoned sites containing hazardous waste and/or contamination. CERCLA was amended in 1986 by the Superfund Amendments and Reauthorization Act, and by the Small Business Liability Relief and Brownfields Revitalization Act of 2002.

CERCLA contains prohibitions and requirements concerning closed and abandoned hazardous waste sites; establishes liability of persons responsible for releases of hazardous waste at these sites; and establishes a trust fund to provide for cleanup when no responsible party can be identified. The trust fund is funded largely by a tax on the chemical and petroleum industries. CERCLA also provides federal jurisdiction to respond directly to releases or impending releases of hazardous substances that may endanger public health or the environment.

CERCLA also enabled the revision of the National Contingency Plan (NCP) which provided the guidelines and procedures needed to respond to releases and threatened releases of hazardous substances, pollutants, or contaminants. The NCP also established the National Priorities List, which identifies hazardous waste sites eligible for long-term remedial action financed under the federal Superfund program.

Prevention of Accidental Releases and Risk Management Programs: Requirements pertaining to the prevention of accidental releases are promulgated in §112 (r) of the CAA Amendments of 1990 [42 U.S.C. §7401 et. seq.]. The objective of these requirements was to prevent the accidental release and to minimize the consequences of any such release of a hazardous substance. Under these provisions, facilities that produce, process, handle or store hazardous substance have a duty to: 1) identify hazards which may result from releases using hazard assessment techniques; 2) design and maintain a safe facility and take steps necessary to prevent releases; and 3) minimize the consequence of accidental releases that occur.

In accordance with the requirements in §112 (r), U.S. EPA adopted implementing guidelines in 40 CFR Part 68. Under this part, stationary sources with more than a threshold quantity of a regulated substance shall be evaluated to determine the potential for and impacts of accidental releases from any processes subject to the federal risk management requirements. Under certain conditions, the owner or operator of a stationary source may be required to develop and submit a Risk Management Plan (RMP). RMPs consist of three main elements: a hazard assessment that includes off-site consequences analyses and a five-year accident history, a prevention program, and an emergency response program. At the local level, RMPs are implemented by the local fire departments.

3.4.2.2.5 Hazardous Material Worker and Public Safety Requirements

Occupational Safety and Health Administration Regulations: The federal Occupational Safety and Health Administration (OSHA) is an agency of the United States Department of Labor that was created by Congress under the Occupational Safety and Health Act in 1970. OSHA is the agency responsible for assuring worker safety in the handling and use of chemicals in the workplace. Under the authority of the Occupational Safety and Health Act of 1970, OSHA has adopted numerous regulations pertaining to worker safety (see 29 CFR Part 1910). These regulations set standards for safe workplaces and work practices, including the reporting of accidents and occupational injuries. Some OSHA regulations contain standards relating to hazardous materials handling to protect workers who handle toxic, flammable, reactive, or explosive materials, including workplace conditions, employee protection requirements, first aid, and fire protection, as well as material handling and storage. For example, facilities which use, store, manufacture, handle, process, or move hazardous materials are required to conduct employee safety training, have available and know how to use safety equipment, prepare illness prevention programs, provide hazardous substance exposure warnings, prepare emergency response plans, and prepare a fire prevention plan.

Procedures and standards for safe handling, storage, operation, remediation, and emergency response activities involving hazardous materials and waste are promulgated in 29 CFR Part 1910, Subpart H. Some key subsections in 29 CFR Part 1910, Subpart H are §1910.106 -Flammable Liquids and §1910.120 - Hazardous Waste Operations and Emergency Response. In particular, the Hazardous Waste Operations and Emergency Response regulations contain requirements for worker training programs, medical surveillance for workers engaging in the handling of hazardous materials or wastes, and waste site emergency and remediation planning, for those who are engaged in specific clean-up, corrective action, hazardous material handling, and emergency response activities (see 29 CFR Part 1910 Subpart H, §1910.120 (a)(1)(i-v) and §1926.65 (a)(1)(i-v)).

Process Safety Management: As part of the numerous regulations pertaining to worker safety adopted by OSHA, specific requirements that pertain to Process Safety Management (PSM) of Highly Hazardous Chemicals were adopted in 29 CFR Part 1910 Subpart H, §1910.119 and 8 CCR §5189 to protect workers at facilities that have toxic, flammable, reactive or explosive materials. PSM program elements are aimed at preventing or minimizing the consequences of catastrophic releases of chemicals and include process hazard analyses, formal training programs for employees and contractors, investigation of equipment mechanical integrity, and an emergency response plan. Specifically, the PSM program requires facilities that use, store, manufacture, handle, process, or move hazardous materials to conduct employee safety training; have an inventory of safety equipment relevant to potential hazards; have knowledge on use of the safety equipment; prepare an illness prevention program; provide hazardous substance exposure warnings; prepare an emergency response plan; and prepare a fire prevention plan.

Emergency Action Plan: An Emergency Action Plan (EAP) is a written document required by OSHA standards promulgated in 29 CFR Part 1910, Subpart E, §1910.38 (a) to facilitate and organize a safe employer and employee response during workplace emergencies. An EAP is required by all that are required to have fire extinguishers. At a minimum, an EAP must include the following: 1) a means of reporting fires and other emergencies; 2) evacuation procedures and emergency escape route assignments; 3) procedures to be followed by employees who remain to operate critical plant operations before they evacuate; 4) procedures to account for all employees after an emergency evacuation has been completed; 5) rescue and medical duties for those employees who are to perform them; and 6) names or job titles of persons who can be contacted for further information or explanation of duties under the plan.

National Fire Regulations: The National Fire Codes (NFC), Title 45, published by the National Fire Protection Association (NFPA) contains standards for laboratories using chemicals, which are not requirements, but are generally employed by organizations in order to protect workers. These standards provide basic protection of life and property in laboratory work areas through prevention and control of fires and explosions, and also serve to protect personnel from exposure to non-fire health hazards.

In addition to the NFC, the NFPA adopted a hazard rating system which is promulgated in NFPA 704 - Standard System for the Identification of the Hazards of Materials for Emergency Response. NFPA 704 is a "standard (that) provides a readily recognized, easily understood system for identifying specific hazards and their severity using spatial, visual, and numerical methods to describe in simple terms the relative hazards of a material. It addresses the health, flammability, instability, and related hazards that may be presented as short-term, acute exposures that are most likely to occur as a result of fire, spill, or similar emergency." In addition, the hazard ratings per NFPA 704 are used by emergency personnel to quickly and easily identify the risks posed by nearby hazardous materials in order to help determine what, if any, specialty equipment should be used, procedures followed, or precautions taken during the first moments of an emergency response. The scale is divided into four color-coded categories, with blue indicating level of health hazard, red indicating the flammability hazard, yellow indicating the chemical reactivity, and white containing special codes for unique hazards such as corrosivity and radioactivity. Each hazard category is rated on a scale from 0 (no hazard; normal substance) to 4 (extreme risk). Table 3.4-1 summarizes what the codes mean for each hazards category.

In addition to the information in Table 3.4-1, a number of other physical or chemical properties may cause a substance to be a fire hazard. With respect to determining whether any substance is classified as a fire hazard, SDS lists the NFPA 704 flammability hazard ratings (e.g., NFPA 704). NFPA 704 is a standard that provides a readily recognized, easily understood system for identifying flammability hazards and their severity using spatial, visual, and numerical methods to describe in simple terms the relative flammability hazards of a material.

TABLE 3.4-1
NFPA 704 Hazards Rating Code

Hazard Rating Code	Health (Blue)	Flammability (Red)	Reactivity (Yellow)	Special (White)
4 = Extreme	Very short exposure could cause death or major residual injury (extreme hazard).	Will rapidly or completely vaporize at normal atmospheric pressure and temperature, or is readily dispersed in air and will burn readily. Flash point below 73°F.	Readily capable of detonation or explosive decomposition at normal temperatures and pressures.	W = Reacts with water in an unusual or dangerous manner.
3 = High	Short exposure could cause serious temporary or moderate residual injury.	Liquids and solids that can be ignited under almost all ambient temperature conditions. Flash point between 73°F and 100°F.	Capable of detonation or explosive decomposition but requires a strong initiating source, must be heated under confinement before initiation, reacts explosively with water, or will detonate if severely shocked.	**OXY** = Oxidizer
2 = Moderate	Intense or continued but not chronic exposure could cause temporary incapacitation or possible residual injury.	Must be moderately heated or exposed to relatively high ambient temperature before ignition can occur. Flash point between 100°F and 200°F.	Undergoes violent chemical change at elevated temperatures and pressures, reacts violently with water, or may form explosive mixtures with water.	**SA** = Simple asphyxiant gas (includes nitrogen, helium, neon, argon, krypton, and xenon).
1 = Slight	Exposure would cause irritation with only minor residual injury.	Must be heated before ignition can occur. Flash point over 200°F.	Normally stable, but can become unstable at elevated temperatures and pressures.	Not applicable
0 = Insignificant	Poses no health hazard, no precautions necessary.	Will not burn.	Normally stable, even under fire exposure conditions, and is not reactive with water.	Not applicable

Although substances can have the same NFPA 704 Flammability Ratings Code, other factors can make each substance's fire hazard very different from each other. For this reason, additional chemical characteristics, such as auto-ignition temperature, boiling point, evaporation rate, flash point, lower explosive limit (LEL), upper explosive limit (UEL), and vapor pressure, are also considered when determining whether a substance is fire hazard. The following is a brief description of each of these chemical characteristics.

Auto-ignition Temperature: The auto-ignition temperature of a substance is the lowest temperature at which it will spontaneously ignite in a normal atmosphere without an external source of ignition, such as a flame or spark.

Boiling Point: The boiling point of a substance is the temperature at which the vapor pressure of the liquid equals the environmental pressure surrounding the liquid. Boiling is a process in which molecules anywhere in the liquid escape, resulting in the formation of vapor bubbles within the liquid.

Evaporation Rate: Evaporation rate is the rate at which a material will vaporize (evaporate, change from liquid to a vapor) compared to the rate of vaporization of a specific known material. This quantity is a represented as a unit less ratio. For example, a substance with a high evaporation rate will readily form a vapor which can be inhaled or explode, and thus have a higher hazard risk. Evaporation rates generally have an inverse relationship to boiling points (i.e., the higher the boiling point, the lower the rate of evaporation).

Flash Point: Flash point is the lowest temperature at which a volatile liquid can vaporize to form an ignitable mixture in air. Measuring a liquid's flash point requires an ignition source. At the flash point, the vapor may cease to burn when the source of ignition is removed. There are different methods that can be used to determine the flashpoint of a solvent but the most frequently used method is the Tagliabue Closed Cup standard (ASTM D56), also known as the TCC. The flashpoint is determined by a TCC laboratory device which is used to determine the flash point of mobile petroleum liquids with flash point temperatures below 175 degrees Fahrenheit (79.4 degrees Centigrade).

Flash point is a particularly important measure of the fire hazard of a substance. For example, the Consumer Products Safety Commission (CPSC) promulgated Labeling and Banning Requirements for Chemicals and Other Hazardous Substances in 15 U.S.C. §1261 and 16 CFR Part 1500. Per the CPSC, the flammability of a product is defined in 16 CFR Part 1500.3 (c)(6) and is based on flash point. For example, a liquid needs to be labeled as: 1) “Extremely Flammable” if the flash point is below 20 degrees Fahrenheit; 2) “Flammable” if the flash point is above 20 degrees Fahrenheit but less than 100 degrees Fahrenheit; or 3) “Combustible” if the flash point is above 100 degrees Fahrenheit up to and including 150 degrees Fahrenheit.

Lower Explosive Limit (LEL): The lower explosive limit of a gas or a vapor is the limiting concentration (in air) that is needed for the gas to ignite and explode or the lowest concentration (percentage) of a gas or a vapor in air capable of producing a flash of fire in presence of an ignition source (e.g., arc, flame, or heat). If the concentration of a substance in air is below the LEL, there is not enough fuel to continue an explosion. In other words, concentrations lower than the LEL are "too lean" to burn. For example, methane gas has a LEL of 4.4 percent (at 138 degrees Centigrade) by volume, meaning 4.4 percent of the total volume of the air consists of methane. At 20 degrees Centigrade, the LEL for methane is 5.1 percent by volume. If the atmosphere has less than 5.1 percent methane, an explosion cannot occur even if a source of ignition is present. When the concentration of methane reaches 5.1 percent, an explosion can occur if there is an ignition source.

Upper Explosive Limit (UEL): The upper explosive limit of a gas or a vapor is the highest concentration (percentage) of a gas or a vapor in air capable of producing a flash of fire in presence of an ignition source (e.g., arc, flame, or heat). Concentrations of a substance in air above the UEL are "too rich" to burn.

Vapor Pressure: Vapor pressure is an indicator of a chemical's tendency to evaporate into gaseous form.

Health Hazards Guidance: In addition to fire impacts, health hazards can also be generated due to exposure of chemicals present in both conventional as well as reformulated products. Using available toxicological information to evaluate potential human health impacts associated with conventional solvents and potential replacement solvents, the toxicity of the conventional solvents can be compared to solvents expected to be used in reformulated products. As a measure of a chemical's potential health hazards, the following values need to be considered: the Threshold Limit Values established by the American Conference of Governmental Industrial Hygiene, OSHA's Permissible Exposure Limits, the Immediately Dangerous to Life and Health levels recommended by the National Institute for Occupational Safety and Health (NIOSH), and health hazards developed by the National Safety Council. The following is a brief description of each of these values.

Threshold Limit Values (TLVs): The TLV of a chemical substance is a level to which it is believed a worker can be exposed day after day for a working lifetime without adverse health effects. The TLV is an estimate based on the known toxicity in humans or animals of a given chemical substance, and the reliability and accuracy of the latest sampling and analytical methods. The TLV for chemical substances is defined as a concentration in air, typically for inhalation or skin exposure. Its units are in parts per million (ppm) for gases and in milligrams per cubic meter (mg/m^3) for particulates. The TLV is a recommended guideline by ACGIH.

Permissible Exposure Limits (PEL): The PEL is a legal limit, usually expressed in ppm, established by OSHA to protect workers against the health effects of exposure to hazardous substances. PELs are regulatory limits on the amount or concentration of a substance in the air. A PEL is usually given as a time-weighted average (TWA), although some are short-term exposure limits (STEL) or ceiling limits. A TWA is the average exposure over a specified period of time, usually eight hours. This means that, for limited periods, a worker may be exposed to concentrations higher than the PEL, so long as the average concentration over eight hours remains lower. A short-term exposure limit is one that addresses the average exposure over a 15 to 30 minute period of maximum exposure during a single work shift. A ceiling limit is one that may not be exceeded for any period of time, and is applied to irritants and other materials that have immediate effects. The OSHA PELs are published in 29 CFR 1910.1000, Table Z1.

Immediately Dangerous to Life and Health (IDLH): IDLH is an acronym defined by NIOSH as exposure to airborne contaminants that is "likely to cause death or immediate or delayed permanent adverse health effects or prevent escape from such an environment." IDLH values are often used to guide the selection of breathing apparatus that are made available to workers or firefighters in specific situations.

3.4.2.2.6 Oil and Pipeline Regulations and Oversight

Oil Pollution Act: The Oil Pollution Act was signed into law in 1990 to give the federal government authority to better respond to oil spills. The Oil Pollution Act improved the federal government's ability to prevent and respond to oil spills, including provision of money and resources. The Oil Pollution Act establishes polluter liability, gives states enforcement rights in navigable waters of the state, mandates the development of spill control and response plans for all vessels and facilities, increases fines and enforcement mechanisms, and establishes a federal trust fund for financing clean-up.

The Oil Pollution Act also establishes the National Oil Spill Liability Trust Fund to provide financing for cases in which the responsible party is either not readily identifiable, or refuses to pay the cleanup/damage costs. In addition, the Oil Pollution Act expands provisions of the National Oil and Hazardous Substances Pollution Contingency Plan, more commonly called the National Contingency Plan, requiring the federal government to direct all public and private oil spill response efforts. It also requires area committees, composed of federal, state, and local government officials, to develop detailed, location-specific area contingency plans. In addition, the Oil Pollution Act directs owners and operators of vessels, and certain facilities that pose a serious threat to the environment, to prepare their own specific facility response plans. The Oil Pollution Act increases penalties for regulatory non-compliance by responsible parties; gives the federal government broad enforcement authority; and provides individual states the authority to establish their own laws governing oil spills, prevention measures, and response methods.

Oil Pollution Prevention Regulation: In 1973, the U.S. EPA issued the Oil Pollution Prevention regulation (see 40 CFR 112)**,** to address the oil spill prevention provisions contained in the Clean Water Act of 1972. The Spill Prevention, Control, and Countermeasure (SPCC) Rule is part of the Oil Pollution Prevention regulations (see 40 CFR Part 112, Subparts A - C). Specifically, the SPCC rule includes requirements for oil spill prevention, preparedness, and response to prevent oil discharges to navigable waters and adjoining shorelines. The rule requires specific facilities to prepare, amend, and implement SPCC Plans. SPCC Plans require applicable facilities to take steps to prevent oil spills including: 1) using suitable storage containers/tanks; 2) providing overfill prevention (e.g., high-level alarms); 3) providing secondary containment for bulk storage tanks; 4) providing secondary containment to catch oil spills during transfer activities; and 5) periodically inspecting and testing pipes and containers.

(U.S. DOT) Office of Pipeline Safety: The Office of Pipeline Safety, within the U.S. DOT's Pipeline and Hazards Material Safety Administration, has jurisdictional responsibility for developing regulations and standards to ensure the safe and secure movement of hazardous liquid and gas pipelines under its jurisdiction in the United States. The Office of Pipeline Safety has the following key responsibilities:

- Support the operation of, and coordinate with the United States Coast Guard on the National Response Center and serve as a liaison with the Department of Homeland Security and the Federal Emergency Management Agency (FEMA) on matters involving pipeline safety;
- Develop and maintain partnerships with other federal, state, and local agencies, public interest groups, tribal governments, and the regulated industry and other underground utilities to address threats to pipeline integrity, service, and reliability and to share responsibility for the safety of communities;

- Administer pipeline safety regulatory programs and develops regulatory policy involving pipeline safety;

- Oversee pipeline operator implementation of risk management and risk-based programs and administer a national pipeline inspection and enforcement program;

- Provide technical and resource assistance for state pipeline safety programs to ensure oversight of intrastate pipeline systems and educational programs at the local level; and

- Support the development and conduct of pipeline safety training programs for federal and state regulatory and compliance staff and the pipeline industry.

49 CFR Parts 178 – 185 relates to the role of transportation, including pipelines, in the United States. 49 CFR Parts 186-199 establishes minimum pipeline safety standards. The Office of the State Fire Marshal works in partnership with the Federal Pipeline and Hazardous Materials Safety Administration to assure pipeline operators are meeting requirements for safe, reliable, and environmentally sound operation of their facilities for intrastate pipelines within California.

Chemical Facility Anti-Terrorism Standards: The Federal Department of Homeland Security established the chemical facility anti-terrorism standards in 2007 (see 6 CFR Part 27). These regulations established risk-based performance standards for the security of chemical facilities and require covered chemical facilities to prepare Security Vulnerability Assessments, which identify facility security vulnerabilities, and to develop and implement Site Security Plans.

3.4.2.3 State Regulations

3.4.2.3.1 Hazardous Materials and Waste Regulations

California Hazardous Waste Control Law: The California Hazardous Waste Control Law is administered by CalEPA to regulate hazardous wastes within the State of California. While the California Hazardous Waste Control Law is generally more stringent than RCRA, both the state and federal laws apply in California. The California Department of Toxic Substances Control (DTSC) is the primary agency in charge of enforcing both the federal and state hazardous materials laws in California. The DTSC regulates hazardous waste, oversees the cleanup of existing contamination, and pursues avenues to reduce hazardous waste produced in California. The DTSC regulates hazardous waste in California under the authority of RCRA, the California Hazardous Waste Control Law, and the H&S. Under the direction of the CalEPA, the DTSC maintains the Cortese List and Envirostor databases of hazardous materials and waste sites as specified under Government Code §65962.5. The Cortese List consists of the following:

1. **Subsection 65962.5. (a)**
   List provided by DTSC that includes:
   a. All hazardous waste facilities subject to corrective action pursuant to Section 25187.5 of the Health and Safety Code.

   b. All land designated as hazardous waste property or border zone property pursuant to Article 11 (commencing with Section 25220) of Chapter 6.5 of Division 20 of the Health and Safety Code.
   c. All information received by the Department of Toxic Substances Control pursuant to Section 25242 of the Health and Safety Code on hazardous waste disposals on public land.
   d. All sites listed pursuant to Section 25356 of the Health and Safety Code.
   e. All sites included in the Abandoned Site Assessment Program.
2. **Subsection 65962.5. (b)**
   The State Department of Health lists of all public drinking water wells that contain detectable levels of organic contaminants and that are subject to water analysis pursuant to Section 116395 of the Health and Safety Code.
3. **Subsection 65962.5. (c)**
   The State Water Resources Control Board shall list of all of the following:
   a. All underground storage tanks for which an unauthorized release report is filed pursuant to Section 25295 of the Health and Safety Code.
   b. All solid waste disposal facilities from which there is a migration of hazardous waste and for which a California regional water quality control board has notified the Department of Toxic Substances Control pursuant to subdivision (e) of Section 13273 of the Water Code.
   c. All cease and desist orders issued after January 1, 1986, pursuant to Section 13301 of the Water Code, and all cleanup or abatement orders issued after January 1, 1986, pursuant to Section 13304 of the Water Code, that concern the discharge of wastes that are hazardous materials.
4. **Subsection 65962.5. (d)**
   The appropriate local enforcement agency will list of all solid waste disposal facilities from which there is a known migration of hazardous waste.

The Hazardous Waste Control Law (22 CCR Chapter 11, Appendix X) also lists 791 chemicals and approximately 300 common materials which may be hazardous; establishes criteria for identifying, packaging, and labeling hazardous wastes; prescribes management controls; establishes permit requirements for treatment, storage, disposal, and transportation; and identifies some wastes that cannot be disposed of in landfills.

California Occupational Safety and Health Administration: The California Occupational Safety and Health Administration (CalOSHA) is the primary agency responsible for worker safety in the handling and use of chemicals in the workplace. The CalOSHA requires the employer to monitor worker exposure to listed hazardous substances and notify workers of exposure (8 CCR Sections 337-340). The regulations specify requirements for employee training, availability of safety equipment, accident-prevention programs, and hazardous substance exposure warnings. CalOSHA standards are generally more stringent than federal regulations.

Hazardous Materials Release Notification: Many state statutes require emergency notification of a hazardous chemical release, including:

- H&S §25270.7, §25270.8, and §25507;

- California Vehicle Code §23112.5;
- California Public Utilities Code §7673 (General Orders #22-B, 161);
- California Government Code §51018 and §8670.25.5(a);
- California Water Code §13271 and §13272; and
- California Labor Code §6409.1(b)10.

California Accident Release Prevention (CalARP) Program: The California Accident Release Prevention Program (19 CCR Division 2, Chapter 4.5) requires the preparation of RMPs. CalARP requires stationary sources with more than a threshold quantity of a regulated substance to be evaluated to determine the potential for and impacts of accidental releases from any processes on-site (not transport) subject to state risk management requirements. RMPs are documents prepared by the owner or operator of a stationary source containing detailed information including: (1) regulated substances held onsite at the stationary source; (2) offsite consequences of an accidental release of a regulated substance; (3) the accident history at the stationary source; (4) the emergency response program for the stationary source; (5) coordination with local emergency responders; (6) hazard review or process hazard analysis; (7) operating procedures at the stationary source; (8) training of the stationary source's personnel; (9) maintenance and mechanical integrity of the stationary source's physical plant; and (10) incident investigation. The CalARP Program is implemented at the local government level by Certified Unified Program Agencies (CUPAs) also known as Administering Agencies (AAs). Typically, local fire departments are the administering agencies of the CalARP Program because they frequently are the first responders in the event of a release. California is proposing modifications to the CalARP Program along with the state's PSM program in response to an accident at the Chevron Richmond Refinery. The proposed regulations were released for public comment on July 15, 2016 and the public comment period closes on September 15, 2016.

Hazardous Materials Disclosure Program: The Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program) as promulgated by CalEPA in CCR, Title 27, Chapter 6.11 requires the administrative consolidation of six hazardous materials and waste programs (program elements) under one agency, a CUPA. The Unified Program administered by the State of California consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities for the state's environmental and emergency management programs, which include Hazardous Waste Generator and On-Site Hazardous Waste Treatment Programs ("Tiered Permitting"); Above ground SPCC Program; Hazardous Materials Release Response Plans and Inventories (business plans); the CalARP Program; the UST Program; and the Uniform Fire Code Plans and Inventory Requirements. The Unified Program is implemented at the local government level by CUPAs.

Hazardous Materials Management Act: The State of California (H&S Division 20, Chapter 6.95) requires any business that handles more than a specified amount of hazardous or extremely hazardous materials, termed a "reportable quantity," to submit a Hazardous Materials Business

Plan to its CUPA. Business plans must include an inventory of the types, quantities, and locations of hazardous materials at the facility. Businesses are required to update their business plans at least once every three years and the chemical portion of their plans every year. Also, business plans must include emergency response plans and procedures to be used in the event of a significant or threatened significant release of a hazardous material. These plans need to identify the procedures to follow for immediate notification to all appropriate agencies and personnel of a release, identification of local emergency medical assistance appropriate for potential accident scenarios, contact information for all company emergency coordinators, a listing and location of emergency equipment at the business, an evacuation plan, and a training program for business personnel. The requirements for hazardous materials business plans are specified in the H&S and 19 CCR.

Hazardous Materials Transportation in California: California regulates the transportation of hazardous waste originating or passing through the State in Title 13, CCR. The California Highway Patrol (CHP) and Caltrans have primary responsibility for enforcing federal and state regulations and responding to hazardous materials transportation emergencies. The CHP enforces materials and hazardous waste labeling and packing regulations that prevent leakage and spills of material in transit and provide detailed information to cleanup crews in the event of an incident. Vehicle and equipment inspection, shipment preparation, container identification, and shipping documentation are all part of the responsibility of the CHP. Caltrans has emergency chemical spill identification teams at locations throughout the state.

California Fire Code: While NFC Standard 45 and NFPA 704 are regarded as nationally recognized standards, the California Fire Code (24 CCR) also contains state standards for the use and storage of hazardous materials and special standards for buildings where hazardous materials are found. Some of these regulations consist of amendments to NFC Standard 45. State Fire Code regulations require emergency pre-fire plans to include training programs in first aid, the use of fire equipment, and methods of evacuation.

3.4.2.4 Local Regulations

South Coast Air Quality Management District – Rule 1166: SCAQMD Rule 1166 - Volatile Organic Compound Emissions from Decontamination of Soil establishes requirements to control the emission of VOCs from excavating, grading, handling, and treating soil contaminated from leakage, spillage, or other means of VOCs deposition. Rule 1166 stipulates that any parties planning on excavating, grading, handling, transporting, or treating soils contaminated with VOCs must first apply for and obtain, and operate pursuant to, a mitigation plan approved by the Executive Officer prior to commencement of operation. BACT is required during all phases of remediation of soil contaminated with VOCs. Rule 1166 also sets forth testing, record keeping and reporting procedures that must be followed at all times. Non-compliance with Rule 1166 can result in the revocation of the approved mitigation plan, the owner and/or the operator being served with a Notice of Violation for creating a public nuisance, or an order to halt the offending operation until the public nuisance is mitigated to the satisfaction of the Executive Officer.

Los Angeles County: The Office of Emergency Management is responsible for organizing and directing the preparedness efforts of the Emergency Management Organization of Los Angeles

County. Los Angeles County's policies towards hazardous materials management include enforcing stringent site investigations for factors related to hazards; limiting the development in high hazard areas, such as floodplains, high fire hazard areas, and seismic hazard zones; facilitating safe transportation, use, and storage of hazardous materials; supporting lead paint abatement; remediating Brownfield sites; encouraging the purchase of homes on the FEMA Repeat Hazard list and designating the land as open space; enforcing restrictions on access to important energy sites; limiting development downslope from aqueducts; promoting safe alternatives to chemical-based products in households; and prohibiting development in floodways. The county has defined effective emergency response management capabilities to include supporting county emergency providers with reaching their response time goals; promoting the participation and coordination of emergency response management between cities and other counties at all levels of government; coordinating with other county and public agency emergency planning and response activities; and encouraging the development of an early warning system for tsunamis, floods and wildfires.

Orange County: Orange County's Hazardous Materials Program Office is responsible for facilitating the coordination of various parts of the County's hazardous materials program; assisting in coordinating county hazardous materials activities with outside agencies and organizations; providing comprehensive, coordinated analysis of hazardous materials issues; and directing the preparation, implementation, and modification of the county's Hazardous Waste Management Plan (HWMP). Orange County is responsible for its own emergency plans concerning a nuclear power plant accident, and the Incident Response Plan is updated regularly.

The regulatory agency responsible for enforcement, as well as inspection of pipelines transporting hazardous materials, is the California State Fire Marshal's Office, Hazardous Liquid Pipeline Division. The Orange County Health Care Agency (OCHCA) has been designated by the Board of Supervisors as the agency to enforce the underground storage tank (UST) program. The OCHCA UST Program regulates approximately 7,000 of the 9,500 underground tanks in Orange County. The program includes conducting regular inspections of underground tanks; oversight of new tank installations; issuance of permits; regulation of repair and closure of tanks; ensuring the mitigation of leaking USTs; pursuing enforcement action; and educating and assisting the industries and general public as to the laws and regulations governing USTs. Under mandate from the California HSC, the Orange County Fire Authority is the designated agency to inventory the distribution of hazardous materials in commercial or industrial occupancies, develop and implement emergency plans, and require businesses that handle hazardous materials to develop emergency plans to deal with these materials.

San Bernardino County: San Bernardino County's HWMP serves as the primary planning document for the management of hazardous waste in San Bernardino County. The HWMP identifies the types and amounts of wastes generated; establishes programs for managing these wastes; identifies an application review process for the siting of specified hazardous waste facilities; identifies mechanisms for reducing the amount of waste generated; and identifies goals, policies, and actions for achieving effective hazardous waste management. One of the county's stated goals is to minimize the generation of hazardous waste and reduce the risk posed by storage, handling, transportation, and disposal of hazardous wastes. In addition, the county will protect its residents and visitors from injury and loss of life and protect property from fires by deploying firefighters and requiring new land developments to prepare site-specific fire protection plans.

Riverside County: Through its membership in the Southern California Hazardous Waste Management Authority (SCHWMA), the County of Riverside has agreed to work on a regional level to solve problems involving hazardous waste. SCHWMA was formed through a joint powers agreement between Santa Barbara, Ventura, San Bernardino, Orange, San Diego, Imperial, and Riverside Counties and the Cities of Los Angeles and San Diego. Working within the concept of "fair share," each SCHWMA county has agreed to take responsibility for the treatment and disposal of hazardous waste in an amount that is at least equal to the amount generated within that county. This responsibility can be met by siting hazardous waste management facilities (transfer, treatment, and/or repository) capable of processing an amount of waste equal to or larger than the amount generated within the county, or by creating intergovernmental agreements between counties to provide compensation to a county for taking another county's waste, or through a combination of both facility siting and intergovernmental agreements. When and where a facility is to be sited is primarily a function of the private market. However, once an application to site a facility has been received, the county will review the requested facility and its location against a set of established siting criteria to ensure that the location is appropriate and may deny the application based on the findings of this review. The County of Riverside does not presently have any of these facilities within its jurisdiction and, therefore, must rely on intergovernmental agreements to fulfill its fair share responsibility to SCHWMA.

3.4.3 EMERGENCY RESPONSE TO HAZARDOUS MATERIALS AND WASTE INCIDENTS

The California Emergency Management Agency (Cal EMA) exists to enhance safety and preparedness in California through strong leadership, collaboration, and meaningful partnerships. The goal of Cal EMA is to protect lives and property by effectively preparing for, preventing, responding to, and recovering from all threats, crimes, hazards, and emergencies. Cal EMA under the Fire and Rescue Division coordinates statewide implementation of hazardous materials accident prevention and emergency response programs for all types of hazardous materials incidents and threats. In response to any hazardous materials emergency, Cal EMA is called upon to provide state and local emergency managers with emergency coordination and technical assistance.

Pursuant to the Emergency Services Act, California has developed an Emergency Response Plan to coordinate emergency services provided by federal, state, and local government agencies and private persons. Response to hazardous materials incidents is one part of this Emergency Response Plan. The Emergency Response Plan is administered by Cal EMA which coordinates the responses of other agencies. Six mutual aid and Local Emergency Planning Committee (LEPC) regions have been identified for California that are divided into three areas of the state designated as the Coastal (Region II, which includes 16 counties with 151 incorporated cities and a population of about eight million people.), Inland (Region III, Region IV and Region V, which includes 31 counties with 123 incorporated cities and a population of about seven million people), and Southern (Region I and Region VI, which includes 11 counties with 226 incorporated cities and a population of about 22 million people). The SCAQMD jurisdiction covers portions of Region I and Region VI.

In addition, pursuant to the Hazardous Materials Release Response Plans and Inventory Law of 1985, local agencies are required to develop "area plans" for response to releases of hazardous materials and wastes. These emergency response plans depend to a large extent on the business plans submitted by persons who handle hazardous materials. An area plan must include pre-emergency planning of procedures for emergency response, notification, coordination of affected government agencies and responsible parties, training, and follow-up.

3.4.4 HAZARDOUS MATERIALS INCIDENTS

Hazardous materials move through the region by a variety of modes: Truck, rail, air, ship, and pipeline. The movement of hazardous materials implies a degree of risk, depending on the materials being moved, the mode of transport, and numerous other factors (e.g., weather and road conditions). According to the Office of Hazardous Materials Safety (OHMS) in the U.S. DOT, hazardous materials shipments can be regarded as equivalent to deliveries, but any given shipment may involve one or more movements or trip segments, which may occur by different routes (e.g., rail transport with final delivery by truck). According to the Commodity Flow Survey data (U.S. DOT, 2015), there were approximately 2.6 billion tons of hazardous materials shipments in the United States in 2012 (the last year for which data are available). Table 3.4-2 indicates that trucks move more than 50 percent and pipeline accounts for approximately 24 percent of all hazardous materials shipped from a location in the United States. By contrast, rail accounts for only 4.3 percent of shipments (U.S. DOT, 2015).

TABLE 3.4-2

Hazardous Material Shipments in the United States in 2012

Mode	Total Commercial Freight (thousand tons)	Hazardous Materials Shipped (thousand tons)	Percent of Total Hazardous Materials Shipped by Mode of Transportation	Percent of Total Commercial Freight Shipped that is Hazardous
Truck	8,060,166	1,531,405	59.4%	19.0%
Rail	1,628,537	110,988	4.3%	6.8%
Water	575,996	283,561	11.0%	49.2%
Pipeline	635,975	626,652	24.3%	98.5%
Other	398,735	27,547	1.1%	6.9%

Total	**11,299,409**	**2,580,153**	**100.0%**	**22.8%**

Source: U.S. DOT, 2016 and U.S. DOT, 2016a

The movement of hazardous materials through the U.S. transportation system represents about 22.8 percent of total tonnage for all freight shipments as measured by the Commodity Flow Survey. Comparatively, the total commercial freight moved in 2012 in California by all transportation modes was 718,345 thousand tons. (U.S. DOT, 2016b).

The California Hazardous Materials Incident Reporting System (CHMIRS) is a post incident reporting system to collect data on incidents involving the accidental release of hazardous materials in California. Information on accidental releases of hazardous materials are reported to and maintained by Cal EMA. While information on accidental releases are reported to Cal EMA, Cal EMA no longer conducts statistical evaluations of the releases, e.g., total number of releases per year for the entire State, or data by county. The U.S. DOT Pipeline and Hazardous Materials Safety Administration (PHMSA) provides access to retrieve data from the Incident Reports Database, which also includes non-pipeline incidents, e.g., truck and rail events. Incident data and summary statistics, e.g., release date, geographical location (state and county) and type of material released, are available online from the Hazmat Incident Database.

Table 3.4-3 provides a summary of the reported hazardous material incidents for Los Angeles, Orange, Riverside, and San Bernardino counties for 2012 through 2014 from the Hazmat Incident Database (PHMSA, 2015). Data presented is for the entire county and not limited to the portion of the county located within the jurisdiction of the SCAQMD.

TABLE 3.4-3

Reported Hazardous Materials Incidents for 2012 - 2014

County	2012	2013	2014
Los Angeles	286	337	287
Orange	270	63	88
Riverside	55	43	50
San Bernardino	261	348	351
Total	**872**	**791**	**776**

In 2012, there were a total of 872 incidents reported for Los Angeles, Orange, Riverside and San Bernardino counties. In 2013, there were a total of 791 incidents reported for Los Angeles, Orange, Riverside and San Bernardino counties, and in 2014 a total of 776 incidents for these four counties. Over the three year period, San Bernardino and Los Angeles counties accounted for the largest number of incidents, followed by Orange and Riverside counties. As noted in Table 3.4-3, the number of incidents have reduced over the years.

3.4.5 HAZARDS ASSOCIATED WITH AIR POLLUTION CONTROL, PRODUCT REFORMULATIONS AND ALTERNATIVE FUELS

The SCAQMD has evaluated the hazards associated with previous AQMPs, proposed SCAQMD rules, and non-SCAQMD projects where the SCAQMD is the Lead Agency pursuant to CEQA. The analyses covered a range of potential air pollution control technologies and equipment. EIRs prepared for the previous AQMPs have specifically evaluated hazard impacts from: (1) add-on control equipment; (2) alternative coating methods; and (3) alternative fuels.

Add-on pollution control technologies which have been previously analyzed for hazards include: carbon adsorption, incineration, post-combustion flue-gas treatment, SCR and selective non-catalytic reduction (SNCR), scrubbers, bag filters, and electrostatic precipitators. The use of add-on pollution control equipment may concentrate or utilize hazardous materials. A malfunction or accident when using add-on pollution control equipment could potentially expose people to hazardous materials, explosions, or fires. The SCAQMD has determined that the transport, use, and storage of ammonia, both aqueous and anhydrous, (used in SCR systems) may have significant hazard impacts in the event of an accidental release. Further analyses have indicated that the use of aqueous ammonia (instead of anhydrous ammonia) can usually reduce the hazards associated with ammonia use in SCR systems to less than significant.

The potential hazards associated with alternative coating methods have been analyzed including powder coatings, radiation-curable coatings, high solids coatings, and waterborne coatings. The greatest hazard associated with both current and alternative coating methods is flammability.

Alternative fuels may be used to reduce emissions from both stationary source equipment and motor vehicles. The 2016 AQMP is technology neutral but does seek emission reductions from lower emitting and zero-emission technologies that could be accomplished with alternative fuels and electric batteries. The alternative fuels which have been analyzed include reformulated gasoline, methanol, compressed natural gas, LPG or propane, and electrically charged batteries. Like conventional fossil fuels, alternative fuels may create fire hazards, explosions or accidental releases during fuel transport, storage, dispensing, and use. Electric batteries also present a slight fire and explosion hazards due to the presence of reactive compounds, which may be subjected to high temperatures.

3.4.5.1 Ammonia

Ammonia is the primary hazardous chemical identified with the use of air pollution control equipment (e.g., SCR and SNCR systems). Ammonia, though not a carcinogen, can have chronic and acute health impacts. Therefore, a potential increase in the use of ammonia may increase the current existing risk setting associated with deliveries (e.g., truck and road accidents) and onsite or offsite spills for each facility that currently uses or will begin to use ammonia. Exposure to a toxic gas cloud is the potential hazard associated with this type of control equipment. A toxic gas cloud is the release of a volatile chemical such as anhydrous ammonia that could form a cloud that migrates off-site, thus exposing individuals. Anhydrous ammonia is heavier than air such that when released into the atmosphere, would form a cloud at ground level rather than be dispersed. "Worst-case" conditions tend to arise when very low wind speeds coincide with the accidental release, which can allow the chemicals to accumulate rather than disperse. Though there are facilities that may be affected by the proposed 2016 AQMP control measures that are currently permitted to use anhydrous ammonia, for new construction, however, current SCAQMD policy no longer allows the use of anhydrous ammonia. Instead, to minimize the hazards associated with ammonia used in the SCR or SNCR process, aqueous ammonia, 19 percent by volume, is typically required as a permit condition associated with the installation of SCR or SNCR equipment for the following reasons: 1) 19 percent aqueous ammonia does not travel as a dense gas like anhydrous ammonia; and 2) 19 percent aqueous ammonia is not on any acutely hazardous material lists unlike anhydrous ammonia or aqueous ammonia at higher percentages.

3.4.5.2 LNG

LNG is essentially no different from the natural gas used in homes and businesses every day, except that it has been refrigerated to minus 259 degrees Fahrenheit at which point it becomes a clear, colorless, and odorless liquid. As a liquid, natural gas occupies only one six-hundredth of its gaseous volume and can be transported economically between continents in special tankers. LNG weighs slightly less than half as much as water, so it floats on fresh or sea water. However, when LNG comes in contact with any warmer surface such as water or air, it evaporates very rapidly ("boil"), returning to its original, gaseous volume. As the LNG vaporizes, a vapor cloud resembling ground fog will form under relatively calm atmospheric conditions. The vapor cloud is initially heavier than air since it is so cold, but as it absorbs more heat, it becomes lighter than air, rises, and can be carried away by the wind. An LNG vapor cloud cannot explode in the open atmosphere, but it could burn.

LNG is considered a hazardous material. The primary safety concerns are the potential consequences of an LNG spill. LNG hazards result from three of its properties:

- Cryogenic temperatures
- Dispersion characteristics
- Flammability characteristics

The extreme cold of LNG can directly cause injury or damage. Although momentary contact on the skin can be harmless, extended contact will cause severe freeze burns. On contact with certain metals, such as ship decks, LNG can cause immediate cracking. Although not poisonous, exposure to the center of a vapor cloud could cause asphyxiation due to the absence of oxygen. LNG vapor clouds can ignite within the portion of the cloud where the concentration of natural gas is between a five and a 15 percent (by volume) mixture with air. To catch fire, however, this portion of the vapor cloud must encounter an ignition source. Otherwise, the LNG vapor cloud will simply dissipate into the atmosphere. An ignited LNG vapor cloud is very dangerous, because of its tremendous radiant heat output. Furthermore, as a vapor cloud continues to burn, the flame could burn back toward the evaporating pool of spilled liquid, ultimately burning the quickly evaporating natural gas immediately above the pool, giving the appearance of a "burning pool" or "pool fire." An ignited vapor cloud or a large LNG pool fire can cause extensive damage to life and property.

Spilled LNG would disperse faster on the ocean than on land, because water spills provide very limited opportunity for containment. Furthermore, LNG vaporizes more quickly on water, because the ocean provides an enormous heat source. For these reasons, most analysts conclude that the risks associated with shipping, loading, and off-loading LNG are much greater than those associated with land-based storage facilities. Preventing spills and responding immediately to spills should they occur are major factors in the design of LNG facilities (CEC, 2003).

Beyond routine industrial hazards and safety considerations, LNG presents specific safety considerations. In the event of an accidental release of LNG, the safety zone around a facility protects neighboring communities from personal injury, property damage or fire. The one and only case of an accident that affected the public was in Cleveland, Ohio in 1944. Research stemming from the Cleveland incident has influenced safety standards used today. Indeed, during the past four decades, growth in LNG use worldwide has led to a number of technologies and practices that will be used in the U.S. and elsewhere in North America as the LNG industry expands. Generally, multiple layers of protection create four critical safety conditions, all of which are integrated with a combination of industry standards and regulatory compliance. The four requirements for safety – primary containment, secondary containment, safeguard systems and separation distance apply across the LNG value chain, from production, liquefaction and shipping, to storage and re-gasification. The term "containment" means safe storage and isolation of LNG (Foss, 2012).

3.4.5.3 LPG

LPG is a mixture of several gases that is generally called "propane," in reference to the mixture's chief ingredient. LPG changes to the liquid state at the moderately high pressures found in an LPG vehicle's fuel tank. LPG is formed naturally, interspersed with deposits of petroleum and natural gas. Natural gas contains LPG, water vapor, and other impurities that must be removed before it can be transported in pipelines as a salable product. Approximately 1,200 facilities in California dispense propane. Nearly all of these facilities are used primarily to fuel residential and commercial applications such as heaters, recreational vehicles and barbeques. About half of all these facilities are capable of providing propane as a motor fuel, though only about three percent of all the fuel dispensed is used for transportation applications (CEC, 2016i).

Propane vehicles emit about one-third fewer reactive organic gases than gasoline-fueled vehicles. Nitrogen oxide and carbon monoxide emissions are also 20 percent and 60 percent less, respectively. Unlike gasoline-fueled vehicles, there are no evaporative emissions while LPG vehicles are running or parked, because LPG fuel systems are tightly sealed. Small amounts of LPG may escape into the atmosphere during refueling, but these vapors are 50 percent less reactive than gasoline vapors, so they have less of a tendency to generate smog-forming ozone. LPG's extremely low sulfur content means that the fuel does not contribute significantly to SOx or particulate emissions.

Many propane vehicles are converted gasoline vehicles. The relatively inexpensive conversion kits include a regulator/vaporizer that changes liquid propane to a gaseous form and an air/fuel mixer that meters and mixes the fuel with filtered intake air before the mixture is drawn into the engine's combustion chambers. Also included in conversion kits is closed-loop feedback circuitry that continually monitors the oxygen content of the exhaust and adjusts the air/fuel ratio as necessary. This device communicates with the vehicle's onboard computer to keep the engine running at optimum efficiency. LPG vehicles additionally require a special fuel tank that is strong enough to withstand the LPG storage pressure of about 130 pounds per square inch. The gaseous nature of the fuel/air mixture in an LPG vehicle's combustion chambers eliminates the cold-start problems associated with liquid fuels. In contrast to gasoline engines, which produce high emission levels while running cold, LPG engine emissions remain similar whether the engine is cold or hot. Also, because LPG enters an engine's combustion chambers as a vapor, it does not strip oil from cylinder walls or dilute the oil when the engine is cold. This helps LPG powered engines to have a longer service life and reduced maintenance costs. Also helping in this regard is the fuel's high hydrogen-to-carbon ratio (C3H8), which enables propane powered vehicles to have less carbon build-up than gasoline- and diesel powered vehicles. LPG delivers roughly the same power, acceleration, and cruising speed characteristics as gasoline. It does yield a somewhat reduced driving range, however, because it contains only about 70-75 percent of the energy content of gasoline. Its high octane rating (around 105) means, though, that an LPG engine's power output and fuel efficiency can be increased beyond what would be possible with a gasoline engine without causing destructive "knocking." Such fine-tuning can help compensate for the fuel's lower energy density. Fleet owners find that propane costs are typically five to 30 percent less than those of gasoline. The cost of constructing an LPG fueling station is also similar to that of a comparably sized gasoline dispensing system. Fleet owners not wishing to establish fueling stations of their own may avail themselves of over 3,000 publicly accessible fueling stations nationwide.

Propane is an odorless, nonpoisonous gas that has the lowest flammability range of all alternative fuels. High concentrations of propane can displace oxygen in the air, though, causing the potential for asphyxiation. This problem is mitigated by the presence of ethyl mercaptan, which is an odorant that is added to warn of the presence of gas. While LPG itself does not irritate the skin, the liquefied gas becomes very cold upon escaping from a high-pressure tank, and may therefore cause frostbite, should it contact unprotected skin. As with gasoline, LPG can form explosive mixtures with air. Since the gas is slightly heavier than air, it may form a continuous stream that stretches a considerable distance from a leak or open container, which may lead to a flashback explosion upon contacting a source of ignition (U.S. DOE, 2003).

While LPG is classified as a fire hazard, it is not classified as a toxic or as a hazardous air pollutant. LPG is a regulated substance subject to both the California and Federal RMP programs in accordance with the CCR, Title 19, §2770.4.1 and Chapter 40 of the CFR Part 68, §68.1263. The threshold quantity for LPG (as propane) as a regulated substance for accidental release prevention is 10,000 pounds. However, when LPG is used as a fuel by an end user (as is frequently the case with residential portable and stationary storage tanks), or when it is held for retail sale as a fuel, it is excluded from RMP requirements, even if the amount exceeds the threshold quantity. On June 1, 2012, SCAQMD adopted Rule 1177 - Liquefied Petroleum Gas Transfer and Dispensing to reduce fugitive VOC emissions released during the transfer and dispensing of LPG at residential, commercial, industrial, chemical, agricultural and retail sales facilities. Rule 1177 applies to the transfer of LPG to and from stationary storage tanks, cylinders and cargo tanks, including bobtails, truck transports and rail tank cars, and into portable refillable cylinders. In addition, Rule 1177 requires the use of low emission fixed liquid level gauges or equivalent alternatives during filling of LPG-containing tanks and cylinders, use of LPG low emission connectors, routine leak checks and repairs of LPG transfer and dispensing equipment, and recordkeeping and reporting to demonstrate compliance. With respect to suppliers and sellers of LPG, H&S §25506 specifically requires all businesses handling hazardous materials to submit a business emergency response plan to assist local administering agencies in the emergency release or threatened release of a hazardous material. Business emergency response plans generally require the following:

1. Identification of individuals who are responsible for various actions, including reporting, assisting emergency response personnel and establishing an emergency response team;

2. Procedures to notify the administering agency, the appropriate local emergency rescue personnel, and the California Office of Emergency Services;

3. Procedures to mitigate a release or threatened release to minimize any potential harm or damage to persons, property or the environment;

4. Procedures to notify the necessary persons who can respond to an emergency within the facility;

5. Details of evacuation plans and procedures;

6. Descriptions of the emergency equipment available in the facility;

7. Identification of local emergency medical assistance; and

8. Training (initial and refresher) programs for employees in: (a) the safe handling of hazardous materials used by the business; (b) methods of working with the local public emergency response agencies; (c) the use of emergency response resources under control of the handler; and (d) other procedures and resources that will increase public safety and prevent or mitigate a release of hazardous materials.

In general, every county or city and all facilities using a minimum amount of hazardous materials are required to formulate detailed contingency plans to eliminate, or at least minimize, the possibility and effect of fires, explosion, or spills. In conjunction with the California Office of Emergency Services, local jurisdictions have enacted ordinances that set standards for area and business emergency response plans. These requirements include immediate notification, mitigation of an actual or threatened release of a hazardous material, and evacuation of the emergency area. Lastly, operators who currently transfer and dispense LPG are well aware of the hazardous nature of LPG, including its flammability and receive periodic training for the safe handling of LPG for the following reasons. Facility operators with a dispensing system for LPG are required to comply with operating pressures pursuant to the standards developed by the American Society of Mechanical Engineers (ASME) Pressure Vessel Code, Section 8; NFPA 58 with regard to venting LPG to the atmosphere; and for LPG tanks that are subject to RMP requirements, operators must obtain permits from, and submit RMPs to, the local CUPA which is typically the city or county fire department. For similar reasons, industrial and commercial customers on the receiving end of LPG deliveries are also well aware of the safety issues associated with LPG. Residential customers, through warning labels on the portable cylinders and on the units to which the portable cylinders connect, are notified of the flammability dangers associated with LPG.

3.4.5.4 Biodiesel

Biodiesel is a domestically produced, renewable fuel derived from biological sources such as vegetable oils, animal fats, or recycled restaurant greases. The process for creating biodiesel involves mixing the oil with alcohol (e.g., methanol or ethanol) in the presence of a chemical such as sodium hydroxide. This process produces a methyl ester if methanol is used or an ethyl ester if ethanol is used. Methyl ester from soy beans is more economical to produce, and, therefore, is more common in the U.S. Biodiesel can be used pure (B100) or blended with conventional diesel. According to the U.S. DOE, pure biodiesel (B100) is considered an alternative fuel under Energy Policy Act. Like petroleum diesel, biodiesel is used to fuel compression-ignition engines, which run on petroleum diesel. Lower-level biodiesel blends are not considered alternative fuels, but covered fleets can earn one Energy Policy Act credit for every 450 gallons of B100 purchased for use in blends of 20 percent or higher (SCAG, 2016). Biodiesel is not flammable, is biodegradable, and reduces air pollutants such as particulates, carbon monoxide, hydrocarbons, and air toxics. However, the materials used to manufacture biodiesel may be hazardous, e.g., ethanol, methanol, sulfuric, and hydrochloric acids. The most common blended biodiesel is B20, which is 20 percent biodiesel and 80 percent conventional diesel

3.4.5.5 Hydrogen

Hydrogen is the simplest, lightest and most plentiful element in the universe. In its normal gaseous state, hydrogen is a colorless, odorless, tasteless, non-toxic and burns invisible. Most hydrogen is made from natural gas through a process known as steam reforming. Reforming separates hydrogen from hydrocarbons by adding heat. Hydrogen can also be produced from a variety of sources including water and biomass. Hydrogen can be used as a combustion fuel or in fuel cell vehicles to produce electricity to power electric motors. Hydrogen is a clean fuel with almost no emissions. The only emission from vehicles is water vapor.

Hydrogen is different from convention gasoline and diesel fuels. It is a gas that must be stored onboard at high pressure or as a cryogenic liquid. It tends to dissipate when released and does not pool. Hydrogen has a much broader flammability range than convention fuels, is flammable, and can cause a fire. Fire represents a hazard for gaseous fueled vehicles, including hydrogen, because, if not mitigated, it can cause fuel containers to explode. Hydrogen and other gaseous fuel storage and delivery systems are designed to prevent rupture by venting hydrogen contents of fuel tanks through thermally activated pressure relief devices in case of an encroaching fire. Further, hydrogen flames are invisible making them difficult to see (NHTSA, 2009).

3.5 HYDROLOGY AND WATER QUALITY

The goal of the 2016 AQMP is to address the federal 2008 eight-hour ozone standard, the 2012 annual PM2.5 standard, and the 2006 24-hour PM2.5 standard, to satisfy the planning requirements of the federal CAA, and to provide an update on the strategy to meet the 1997 8-hour ozone NAAQS and 1979 1-hour ozone NAAQS, thereby improving air quality and protecting public health. The 2016 AQMP also provides a preliminary evaluation of the 2015 federal 8-hour ozone standard (70 ppb). Some of the proposed control measures intended to improve overall air quality may have direct or indirect hydrology and water quality impacts associated with their implementation. Hydrology and water quality concerns are related to implementation of control measures that could result in increased water demand and wastewater generation, e.g., wet gas scrubbers and electrostatic precipitators. This section describes the current hydrology and water quality resources in Southern California.

3.5.1 REGULATORY BACKGROUND

Water resources are regulated by an overlapping network of local, state, federal and international laws and regulations. As a result, the authority to address a given discharge or activity is not always clear. Therefore, the regulatory background is broken down by the following topics: Water Quality; Regional Water Quality Management; Watershed Management; Wastewater Treatment; Drinking Water Standards; and, local regulations. This subchapter describes existing regulatory setting relative to hydrology and water quality, including water supply, water demand, and drought trends within California and the SCAQMD.

3.5.1.1 Water Quality

The principal laws governing water quality in Southern California are the federal Clean Water Act (CWA) and the corresponding California law, the Porter-Cologne Water Quality Act. The U.S. EPA is the federal agency responsible for water quality management and administration of the federal CWA. The U.S. EPA has delegated most of the administration of the CWA in California to the California State Water Resources Control Board (SWRCB). The SWRCB was established through the California Porter-Cologne Water Quality Act of 1969, and is the primary state agency responsible for water quality management issues in California. Much of the responsibility for implementation of the SWRCB's policies is delegated to the nine Regional Water Quality Control Boards (RWQCBs).

3.5.1.1.1 National Pollutant Discharge Elimination System Permit Program

The CWA §402 established the National Pollutant Discharge Elimination System (NPDES) to regulate discharges into "navigable waters" of the United States. The U.S. EPA authorized the SWRCB to issue NPDES permits in the State of California in 1974. The NPDES permit establishes discharge pollutant thresholds and operational conditions for industrial facilities and wastewater treatment plants. For point source discharges (e.g., wastewater treatment facilities), the RWQCBs prepare specific effluent limitations for constituents of concern such as toxic substances, total suspended solids (TSS), bio-chemical oxygen demand (BOD), and organic compounds. The limitations are based on the Basin Plan objectives and are tailored to the specific receiving waters, allowing some discharges, for instance deep water outfalls in the Pacific Ocean, and more flexibility with certain constituents due to the ability of the receiving waters to accommodate the effluent without significant impact. Non-point source NPDES permits are also required for municipalities and unincorporated communities of populations greater than 100,000 to control urban stormwater runoff. These municipal permits include Storm Water Management Plans (SWMPs). A key part of the SWMP is the development of Best Management Practices (BMPs) to reduce pollutant loads. Certain businesses and projects within the jurisdictions of these municipalities are required to prepare Storm Water Pollution Prevention Plans (SWPPPs) which establish the appropriate BMPs to gain coverage under the municipal permit. On October 29, 1999, the U.S. EPA finalized the Storm Water Phase II rule which requires smaller urban communities with a population less than 100,000 to acquire individual storm water discharge permits.

The Phase II rule also requires construction activities on one to five acres to be permitted for storm water discharges. Individual storm water NPDES permits are required for specific industrial activities and for construction sites greater than five acres. Statewide general storm water NPDES permits have been developed to expedite discharge applications. They include the statewide industrial permit and the statewide construction permit. A prospective applicant may apply for coverage under one of these permits and receive Waste Discharge Requirements (WDRs) from the appropriate RWQCB. WDRs establish the permit conditions for individual dischargers. The Stormwater Phase II Rule automatically designates, as small construction activity under the NPDES stormwater permitting program, all operators of construction site activities that result in a land disturbance of equal to or greater than one and less than five acres. Site activities that disturb less than one acre are also regulated as small construction activity if they are part of a larger common plan of development or sale with a planned disturbance of equal to or greater than one acre and less than five acres, or if they are designated by the NPDES permitting authority. The NPDES permitting authority or U.S. EPA Region may designate construction activities disturbing less than one acre based on the potential for contribution to a violation of a water quality standard or for significant contribution of pollutants to waters of the United States.

3.5.1.1.2 Municipal Stormwater and Urban Runoff Discharge Permits

The Municipal Stormwater Permitting Program regulates stormwater discharges from municipal separate storm sewer systems (MS4s). The RWQCB, with oversight by U.S. EPA, administers the MS4 permitting program in the Los Angeles area. The MS4 permits require the municipal discharger (typically, a city or county) to develop and implement a SWMP with the goal of reducing the discharge of pollutants to the maximum extent practicable. The SWMP program specifies what BMPs will be applied to address certain program areas such as public education and outreach, illicit discharge detection and elimination, construction and port-construction, and good housekeeping for municipal operations. MS4 permits also generally include a monitoring program.

3.5.1.1.3 CWA §303 – Total Maximum Daily Loads

The CWA §303(d) requires the SWRCB to prepare a list of impaired water bodies in the state and determine total maximum daily loads (TMDLs) for pollutants or other stressors impacting water quality of these impaired water bodies. A TMDL is a quantitative assessment of water quality conditions, contributing sources, and the load reductions or control actions needed to restore and protect bodies of water in order to meet their beneficial uses. All sources of the pollutants that caused each body of water to be included on the list, including point sources and non-point sources, must be identified. The California §303 (d) list was completed in March 1999. On July 25, 2003, U.S. EPA gave final approval to California's 2002 revision of §303 (d) List of Water Quality Limited Segments. A priority schedule has been developed to determine TMDLs for impaired waterways. TMDL projects are in various stages throughout the Basin for most of the identified impaired water bodies. The RWQCBs will be responsible for ensuring that total discharges do not exceed TMDLs for individual water bodies as well as for entire watersheds.

3.5.1.1.4 State Water Quality Certification Program

The RWQCBs also coordinate the State Water Quality Certification program, or CWA §401. Under CWA §401, states have the authority to review any federal permit or license that will result in a discharge or disruption to wetlands and other waters under state jurisdiction to ensure that the actions will be consistent with the state‘s water quality requirements. This program is most often associated with CWA §404 which obligates the U.S. Army Corps of Engineers to issue permits for the movement of dredge and fill material into and from “waters of the United States.”

3.5.1.2 Regional Water Quality Management

Water quality of regional surface water and groundwater resources is affected by point source and non-point source discharges occurring throughout individual watersheds. Regulated point sources, such as wastewater treatment effluent discharges, usually involve a single discharge into receiving waters. Non-point sources involve diffuse and non-specific runoff that enters receiving waters through storm drains or from unimproved natural landscaping. Common non-point sources include urban runoff, agriculture runoff, resource extraction (on-going and historical), and natural drainage. Within the regional basin plans, the RWQCBs establish water quality objectives for surface water and groundwater resources and designate beneficial uses for each identified water body.

The Water Quality Control Plan: Los Regional Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties (Basin Plan) is designed to preserve and enhance water quality and to protect beneficial uses of regional waters. The Basin Plan was first approved in 1994 and has been amended numerous times since then. The Basin Plan designates beneficial uses of surface water and ground water, such as contact recreation or municipal drinking water supply. The Basin Plan also establishes water quality objectives, which are defined as “the allowable limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance in a specific area.” The Basin Plan specifies objectives for specific constituents, including bioaccumulation, chemical constituents, dissolved oxygen, oil and grease, pesticides, pH, polychlorinated biphenyls, suspended solids, toxicity, and turbidity.

California Water Code, Division 7, Chapter 5.6 established a comprehensive program within the SWRCB to protect the existing and future beneficial uses of California's enclosed bays and estuaries. The Bay Protection and Toxic Cleanup Plan (BPTCP) has provided a new focus on the SWRCB and the RWQCBs' efforts to control pollution of the State's bays and estuaries by establishing a program to identify toxic hot spots and plans for their cleanup. In June 1999, the SWRCB published a list of known toxic hot spots in estuaries, bays, and coastal waters.

Other statewide programs run by the SWRCB to monitor water quality include the California State Mussel Watch Program and the Toxic Substances Monitoring Program. The Department of Fish and Wildlife (DFW) collects water and sediment samples for the SWRCB for both of these programs and provides extensive statewide water quality data reports annually. In addition, the RWQCBs conduct water sampling for Water Quality Assessments required by the CWA and for specific priority areas under restoration programs such as the Santa Monica Bay Restoration Program.

3.5.1.3 Watershed Management

In February 1998, the Clean Water Action Plan (CWAP) was established to require states and tribes, with assistance from federal agencies and input from stakeholders and private citizens, to convene and work collaboratively to develop Unified Watershed Assessments (UWA). The CWAP designated watersheds to one of the following categories:

Category I: Watersheds that are candidates for increased restoration because of poor water quality or the poor status of natural resources.

Category II: Watersheds that have good water quality but can still improve.

Category III: Watersheds with sensitive areas on federal, state, or tribal lands that need protection.

Category IV: Watersheds for which there is insufficient information to categorize them.

Targeted watersheds and watershed priorities and activities were identified for each of California's nine RWQCBs. Examples of targeted watersheds include the Santa Monica Bay Restoration Commission and the Malibu Creek Watershed Non-Point Source Pilot Project.

3.5.1.4 Wastewater Treatment

The federal government enacted the CWA to regulate point source water pollutants, particularly municipal sewage and industrial discharges, to waters of the United States through the NPDES permitting program. In addition to establishing a framework for regulating water quality, the CWA authorized a multibillion dollar Clean Water Grant Program, which together with the California Clean Water Bond funding, assisted communities in constructing municipal wastewater treatment facilities. These financing measures made higher levels of wastewater treatment possible for both large and small communities throughout California, significantly improving the quality of receiving waters statewide. Wastewater treatment and water pollution control laws in California are codified in the CWC and CCR, Titles 22 and 23. In addition to federal and state restrictions on wastewater discharges, most incorporated cities in California have adopted local ordinances for wastewater treatment facilities. Local ordinances generally require treatment system designs to be reviewed and approved by the local agency prior to construction. Larger urban areas with elaborate infrastructure in place would generally prefer new developments to hook into the existing system rather than construct new wastewater treatment facilities. Other communities promote individual septic systems to avoid construction of potentially growth accommodating treatment facilities. The RWQCBs generally delegate management responsibilities of septic systems to local jurisdictions. Regulation of wastewater treatment includes the disposal and reuse of biosolids.

3.5.1.5 Drinking Water Standards

The federal Safe Drinking Water Act, enacted in 1974 and implemented by the U.S. EPA, imposes water quality and infrastructure standards for potable water delivery systems nationwide. The primary standards are health-based thresholds established for numerous toxic substances. Secondary standards are recommended thresholds for taste and mineral content. The State of California was first granted primary enforcement responsibility for public water systems under section 1413 of the Safe Drinking Water Act on June 2, 1978 (43 FR 25180, June 9, 1978).

The California Safe Drinking Water Act, enacted in 1976, is codified in Title 22 of the CCR. The California Safe Drinking Water Act provides for the operation of public water systems and imposes various duties and responsibilities for the regulation and control of drinking water in the State of California including enforcing provisions of the federal Safe Drinking Water Act. The California Safe Drinking Water Program was originally implemented by the California Department of Public Health until July 1, 2014 when the program was transferred to the SWRCB via an act of legislation, SB 861. This transfer of authority means that the SWRCB has regulatory and enforcement authority over drinking water standards and water systems under Health and Safety Code §116271.

Potable water supply is managed through the following agencies and water districts: the California Department of Water Resources (DWR), the California Department of Health Services (DHS), the SWRCB, the U.S. EPA, and the U.S. Bureau of Reclamation. Water right applications are processed through the SWRCB for properties claiming riparian rights. The DWR manages the State Water Project (SWP) and compiles planning information on water supply and water demand within the state. Primary drinking water standards are promulgated in the CWA §304 and these standards require states to ensure that potable water retailed to the public meets these standards. Standards for a total of 88 individual constituents, referred to as Maximum Contaminant Levels (MCLs) have been established under the Safe Drinking Water Act as amended in 1986 and 1996. The U.S. EPA may add additional constituents in the future. The MCL is the concentration that is not anticipated to produce adverse health effects after a lifetime of exposure. State primary and secondary drinking water standards are codified in CCR Title 22 §§64431 - 64501. Secondary drinking water standards incorporate non-health risk factors including taste, odor, and appearance. The 1991 Water Recycling Act established water recycling as a priority in California. The Water Recycling Act encourages municipal wastewater treatment districts to implement recycling programs to reduce local water demands. The DHS enforces drinking water standards in California.

3.5.1.6 Local Regulation

In addition to federal and state regulations, cities, counties and water districts may also provide regulatory advisement regarding water resources. Many jurisdictions incorporate policies related to water resources in their municipal codes, development standards, storm water pollution prevention requirements, and other regulations.

3.5.2 HYDROLOGY

3.5.2.1 Water Sources

The State of California is divided into ten hydrologic (see Figure 3.5-1) regions corresponding to the state's major water drainage basins. The hydrologic regions define a river basin drainage area and are used as planning boundaries, which allows consistent tracking of water runoff, and the accounting of surface water and groundwater supplies.

The Basin is within the South Coast Hydrologic Region. The South Coast Hydrologic Region is the most urbanized and populous region in the state of California. More than half the population of the state resides in the region, which covers 11,000 square miles, or seven percent of the state's total area. The region extends from the Pacific Ocean east to mountains of the Transverse and Peninsular ranges, and from the Ventura-Santa Barbara County line south to the international border with Mexico. It includes all of Orange County and portions of Ventura, Los Angeles, San Bernardino, Riverside, and San Diego counties.

The topography of the South Coast Hydrologic Region, excluding the mountainous portions, provides the ideal conditions to accommodate the steady expansion of the residential, commercial, and industrial developments throughout. Yet there remains sufficient land to sustain the important agricultural operations in Ventura and San Diego Counties and the Chino and San Jacinto Valleys. The coastal zone encompasses the Oxnard Plain (or the Ventura Basin), the Los Angeles Basin, and the Coastal Plain of Orange County. These alluvial basins are heavily utilized for urban, agricultural, or a combination of both uses. These same uses are also occurring in the warmer interior basins of the south coast region. These regions are often separated from their coastal counterparts by hills (Chino Hills) and small to moderately sized mountain ranges (Santa Ana and the Santa Monica mountains).

Prominent mountain ranges provide the northern and eastern boundaries of the region. In the north, there are the San Gabriel Mountains and several mountain ranges known collectively as the Ventura County Mountains, which includes the Topatopa Mountains. To the east, there are the San Bernardino, San Jacinto, Borrego, and Vallecito Mountains.

FIGURE 3.5-1

Hydrologic Regions of California

The cities of Ventura, Los Angeles, Long Beach, Santa Ana, San Bernardino, and Big Bear Lake are among the many urban areas in this section of the state which contain moderated-sized mountains, inland valleys, and coastal plains. The Santa Clara, Los Angeles, San Gabriel, and Santa Ana Rivers are among the area's hydrologic features. In addition to water sources with the South Coast Hydrologic Region, imported water makes up a major portion of the water used in the Basin. Water is brought into the South Coast Hydrologic Region from three major sources: the Sacramento-San Joaquin Delta (Delta), Colorado Rivers, and Owens Valley/Mono Basin. Most lakes in the area are actually reservoirs, made to hold water coming from the SWP, the Los Angeles Aqueduct, and the Colorado River Aqueduct (CRA) including Castaic Lake, Lake Mathews, Lake Perris, Silverwood Lake, and Diamond Valley Lake. In addition to holding water, Lake Casitas, Big Bear Lake and Lorena Lake regulate local runoff.

Although much of the land in the region is urbanized or is part of agriculture, all or portions of several national and state parks are located in the South Coast Hydrologic Region. They are the Santa Monica Mountains Recreational Area; Los Padres, Angeles, San Bernardino, and Cleveland National Forests; and Cuyamaca-Rancho, Malibu State, and Chino Hills State Parks (DWR, 2013a).

3.5.2.2 Surface Water Hydrology

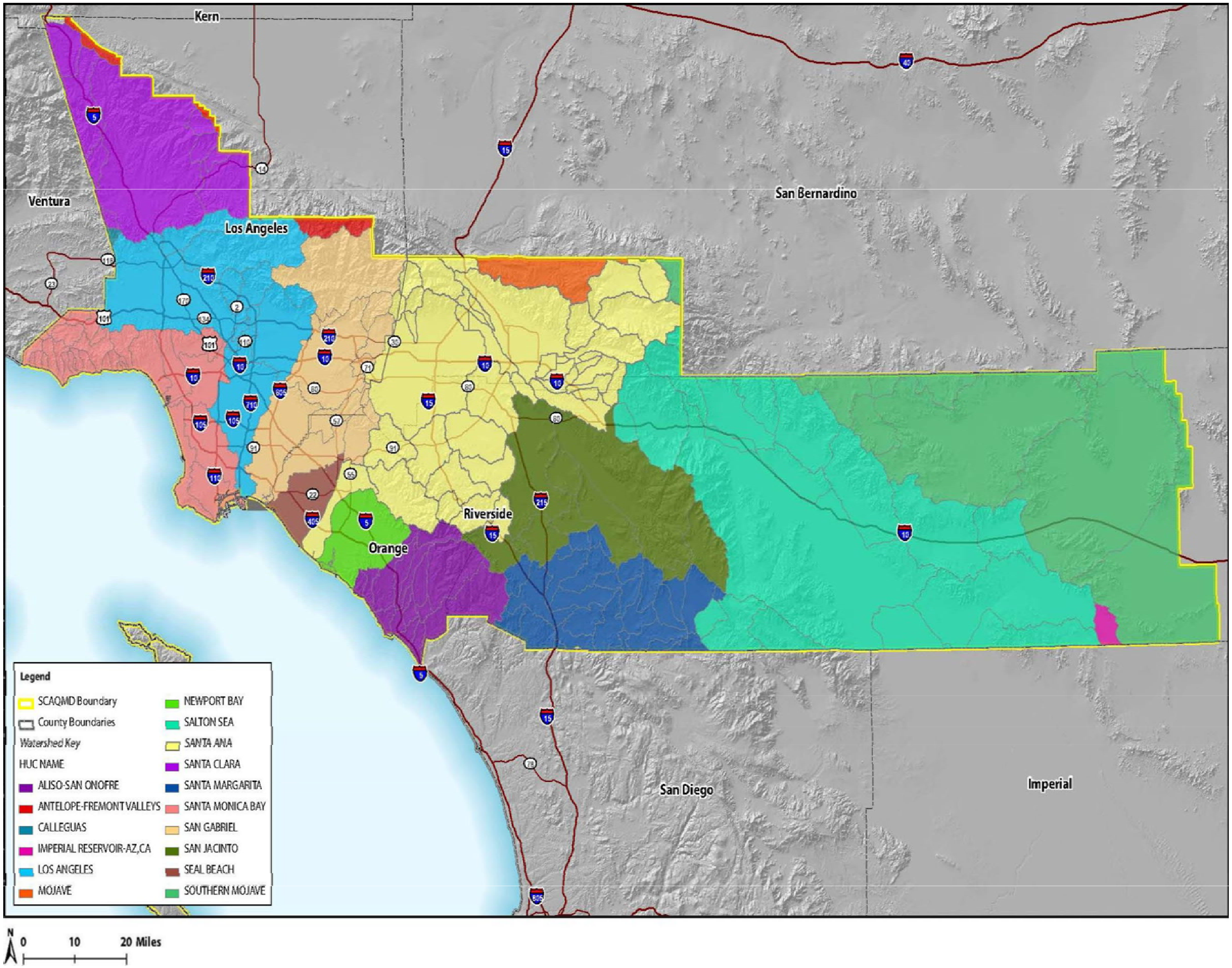
Surface water hydrology refers to surface water systems, including watersheds, floodplains, rivers, streams, lakes and reservoirs, and the inland Salton Sea.

3.5.2.2.1 Watersheds

The South Coast Hydrologic Region is bounded peripherally by a drainage divide and features leading to bodies of water. The boundary that separates neighboring drainage basins from another is called a watershed boundary. The area that separates one boundary from another is a watershed, an area with land or basin in which all waterways drain to one specific outlet, or body of water, such as a river, lake, ocean, or wetland. Watersheds have topographical divisions such as ridges, hills, or mountains. All precipitation that falls in a given watershed, or basin, eventually drains into the same body of water.

Over 20 of these watersheds are major watersheds within the Southern California region (see Figure 3.5-2), all of which are outlined and shaped by the various topographic features of the region. Given the physiographic characteristics of the region, most of the watersheds are located along the Transverse and Peninsular Ranges, and only a small number are in the desert areas (Mojave and Colorado Desert) (SCAG, 2016).

FIGURE 3.5-2
Watersheds in the South Coast Hydrologic Region



3.5.2.2.2 Rivers

Because the climate of Southern California is predominantly arid, many of the natural rivers and creeks are intermittent or ephemeral, drying up in the summer or flowing only after periods of precipitation. For example, annual rainfall amounts vary depending on elevation and proximity to the coast. Some waterways such as Ballona Creek and the Los Angeles River, maintain a perennial flow due to agricultural irrigation and urban landscape watering. Major natural streams and rivers in the Southern California region include the Ventura River, Santa Clara River, Los Angeles River, San Gabriel River, Santa Ana River, San Jacinto River, and upstream portions of the Santa Margarita River (see Figure 3.5-3).

The Ventura River is fed by Lake Casitas on the western border of Ventura County and empties out into the ocean. It is the northernmost river system in Southern California, supporting a large number of sensitive aquatic species. Water quality decreases in the lower reaches due to urban and industrial impacts. The Santa Clara River starts in Los Angeles County, flows through the center of Ventura County, and remains in a relatively natural state. Threats to water quality include increasing development in floodplain areas, flood control measures such as channeling, erosion, and loss of habitat.

The Los Angeles River is a highly disturbed system due to the flood control features along much of its length. Due to the high urbanization in the area around the Los Angeles River, runoff from industrial and commercial sources as well as illegal dumping contribute to reduce the channel's water quality. The San Gabriel River is similarly altered with concrete flood control embankments and impacted by urban runoff.

The Santa Ana River drains the San Bernardino Mountains, cuts through the Santa Ana Mountains, and flows onto the Orange County coastal plain. Recent flood control projects along the river have established reinforced embankments for much of the river's path through urbanized Orange County. The Santa Margarita River begins in Riverside County, draining portions of the San Jacinto Mountains and flowing to the ocean through northern San Diego County (SCAG, 2016).

3.5.2.2.3 Lakes and Reservoirs

Since Southern California is a semiarid region, many of its lakes are drinking water reservoirs which were created either through damming of rivers, or manually dug and constructed. Reservoirs also serve as flood control for downstream communities. Table 3.5-1 lists the major lakes and reservoirs in Southern California. Some of the most significant lakes, including reservoirs, in the Southern California region are Big Bear Lake, Lake Arrowhead, Lake Casitas, Castaic Lake, Pyramid Lake, Lake Elsinore, Diamond Valley Lake, and the Salton Sea.

FIGURE 3.5-3
Rivers within the South Coast Hydrologic Region

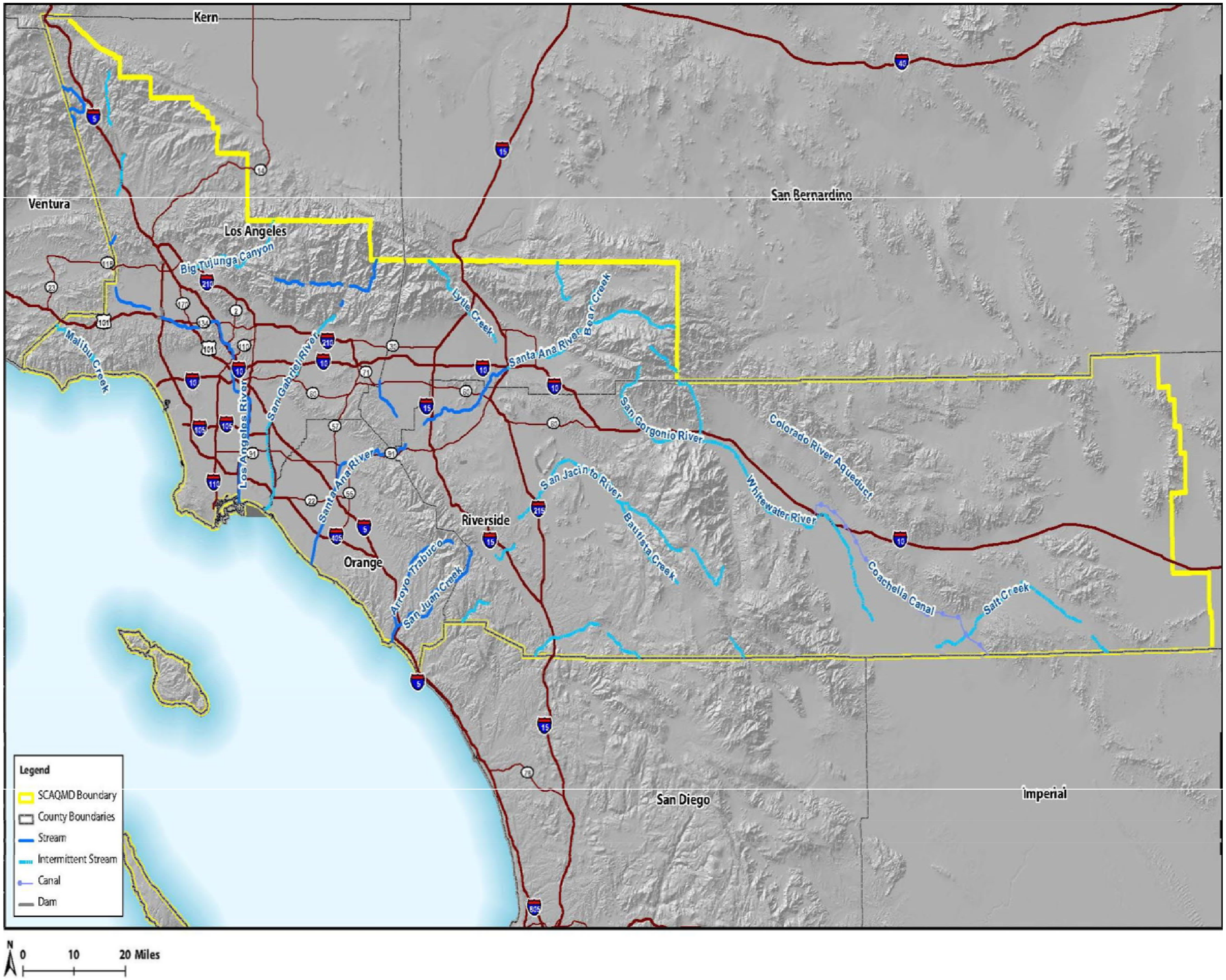


TABLE 3.5-1
Major Surface Water Resources in Southern California

Los Angles Basin (Region 4)
Ventura River Estuary Sespe Creek Lake Casitas
Santa Clara River Estuary Piru Creek Lake Piru
McGrath Lake Ventura River Pyramid Lake
Ormond Beach Wetlands Santa Clara River Castaic Lake
Mugu Lagoon Los Angeles River Bouquet Reservoir
Trancas Lagoon Big Tahunga Canyon Los Angeles Reservoir
Topanga Lagoon San Gabriel River Chatsworth Reservoir
Los Cerritos Wetlands
Sepulveda Reservoir
Los Angeles River San Gabriel Reservoir
Ballona Wetlands Morris Reservoir
Whittier Narrows Reservoir
Santa Fe Reservoir
Lahontan Basin (Region 6)
Mojave River Silver Lake
Amargosa River Silverwood Lake
Mojave River Reservoir
Lake Arrowhead
Soda Lake
Colorado River Basin (Region 7)
Colorado River Lake Havasu
Whitewater River Gene Wash Reservoir
Alamo River Copper Basin Reservoir
New River Salton Sea
Lake Cahulla
Santa Ana (Region 8)
Hellman Ranch Wetlands Santa Ana River Prado Reservoir
Anaheim Bay San Jacino River Big Bear Lake
Bolsa Chica Wetlands
Lake Perris
Huntington Wetlands Lake Matthews
Santa Ana River Lake Elsinore
Laguna Lakes Vail Lake
San Juan Creek Lake Skinner
Upper Newport Bay Lake Hemet
San Joaquin Marsh
Prado Wetlands
San Diego Basin (Region 9)
Santa Margarita River Vail Lake
Aliso Creek Skinner Reservoir

Source: SCAG, 2016

Big Bear Lake is a reservoir in San Bernardino County, in the San Bernardino Mountains. It was created by a granite dam in 1884, which was expanded in 1912, and holds back approximately 73,000 acre-feet of water. The lake has no tributary inflow, and is replenished entirely by snowmelt. It provides water for the community of Big Bear, as well as nearby communities. Lake Arrowhead is also in San Bernardino County, at the center of an unincorporated community also called Lake Arrowhead. The lake is a man-made reservoir, with a capacity of approximately 48,000 acre-feet. In 1922, the dam at Lake Arrowhead was completed. It is currently used for recreation and as a potable water source for the surrounding community.

Castaic Lake is on the Castaic Creek, and was formed by the completion of the Castaic Dam. The lake is in northwestern Los Angeles County. It is the terminus of the West Branch of the California Aqueduct, and holds over 323,000 acre-feet of water. Much of the water is distributed throughout northern Los Angeles County, though some is released into Castaic Lagoon, which feeds Castaic Creek. The creek is a tributary of the Santa Clara River. Pyramid Lake is just above Castaic Lake, and water flows from Pyramid into Castaic through a pipeline, generating electricity. Pyramid Lake is on Piru Creek, and holds 180,000 acre-feet of water.

Lake Elsinore is in the City of Lake Elsinore, in Riverside County. The lake has dried up and been replenished throughout the last century. It is now managed to maintain a consistent water level, with outflow piped into the Temescal Canyon Wash. Diamond Valley Lake, also in Riverside County, is Southern California's newest and largest reservoir. Diamond Valley Lake was a project of the Metropolitan Water District (MWD) to expand surface storage capacity in the region. A total of three dams were required to create the lake. Completed in 1999, it was full by 2002, holding 800,000 acre-feet of water, effectively doubling MWD's surface water stores in the region. The lake is connected to the existing water infrastructure of the SWP. The lake is situated at approximately 1,500 feet above sea level, well above most of the users of the lake's water; this enables the lake to also provide hydroelectric power, as water flows through the lowest dam.

The Salton Sea is the largest lake in California at nearly 400 square miles in size. The basin of the Salton Sea is over 200 feet below sea level, and has flooded and evaporated many times over when the Colorado overtops its banks during extreme flood years. This cycle of flooding and evaporation has re-created the Salton Sea several times over at least the last thousand years. Its most recent formation occurred in 1905 after an irrigation canal was breached and the Colorado River flowed into the basin for 18 months creating the current lake. The principal inflow to the Salton Sea is from agricultural drainage, which is high in dissolved salts; approximately four million tons of dissolved salts flow into the Salton Sea every year. The evaporation of water from the Salton Sea, plus the addition of highly saline water from agriculture, has created one of the saltiest bodies of water in the world. The Salton Sea has been a highly successful fishery and is a habitat and migratory stopping and breeding area for 380 different bird species; however, the high, and ever-increasing, salinity of the water is a continual challenge for the fish and birds that inhabit it. The 2001 agriculture-to-urban water transfer agreement between the Imperial Valley Irrigation District and San Diego County Water Authority had significant implications for the Salton Sea, and the watershed. The reduction in agricultural water flowing into the Salton Sea has lowered water levels, shrinking its overall size (SCAG, 2016).

3.5.2.2.4 Coastal Waters

Coastal waters in the Southern California region include bays, harbors, estuaries, beaches, and open ocean. Santa Monica Bay dominates a large portion of the SCAQMD's open coastal waters. Deep-draft commercial harbors include the Los Angeles/Long Beach Harbor, while shallower, small-craft harbors, such as Marina del Rey, King Harbor and Newport Bay, occur at a number of locations.

Wetlands along the coast include a number of small coastal wetlands such as Ballona Wetlands and Los Cerritos Wetlands. Recreational beaches occur along large stretches of the coastal waters. These coastal waters are impacted by a variety of activities, including:

- Municipal and industrial wastewater discharges;
- Cooling water discharges;
- Non-point source runoff (urban and agricultural runoff in particular), including leaking
- septic systems, construction, and recreational activities;
- Oil spills;
- Aqueduct vessel wastes;
- Dredging, increased development, and loss of habitat;
- Offshore operations, illegal dumping; and
- Natural oil seeps.

3.5.2.3 Groundwater Hydrology

Groundwater is the part of the hydrologic cycle representing underground water sources. Groundwater is present in many forms: in reservoirs, both natural and constructed; in underground streams; and, in the vast movement of water in and through sand, clay, and rock beneath the earth's surface. The place where groundwater comes closest to the surface is called the water table, which in some areas may be very deep, and in others may be right at the surface. Groundwater hydrology is, therefore, connected to surface water hydrology, and cannot be treated as a separate system. One example of how groundwater hydrology can directly impact surface water hydrology is when surface streams are partly filled by groundwater. When that groundwater is pumped out and removed from the system, the stream levels will fall, or even dry up entirely, even though no water was removed from the stream itself.

Groundwater represents most of the Basin's fresh water supply, making up approximately 34 percent of total water use, depending on the year and precipitation levels (DWR, 2013a). The majority of groundwater supplies (about 76 percent) are used to meet urban use, while the rest goes to agricultural uses (DWR, 2013a). Groundwater basins are replenished mainly through infiltration – precipitation soaking into the ground and making its way into the groundwater. Threats to the function of this system are increases in impervious surfaces, overdraft, and contamination.

Impervious surface decreases the area available for groundwater recharge, as precipitation runoff flows off of streets, buildings, and parking lots directly into storm sewers, and straight into either river channels or into the ocean. This prevents the natural recharge of groundwater, effectively removing groundwater from the system without any pumping. Impervious surface also deteriorates the quality of the water, as it moves over streets and buildings, gathering pollutants and trash before entering streams, rivers, and the ocean.

Groundwater resources in the South Coast Hydrologic Region are supplied by alluvial and fractured rock aquifers. Alluvial aquifers are composed of sand and gravel or finer grained sediments, with groundwater stored within the voids, or pore space, between the alluvial sediments. Fractured-rock aquifers consist of impermeable granitic, metamorphic, volcanic, and hard sedimentary rocks, with groundwater being stored within cracks, fractures, or other void spaces. The distribution and extent of alluvial and fractured-rock aquifers and water wells vary within the region (DWR, 2013a). A brief description of the aquifers in the region is provided below.

The South Coast Hydrologic Region contains 73 alluvial groundwater basins and sub-basins that underlie approximately 3,500 square miles, or 32 percent, of the region. Most of the groundwater used in the South Coast region is derived from alluvial aquifers. The most heavily extracted groundwater basins in the region are the Coastal Plain of Los Angeles, Coastal Plain of Orange County, the Upper Santa Ana Valley, and the Santa Clara River Valley Groundwater Basins (DWR, 2013a).

Metropolitan Los Angeles and Santa Ana planning areas are the largest users of groundwater in the region. Major groundwater basins in the Metropolitan Los Angeles planning area serve the intensely urbanized and industrialized inland areas of Los Angeles County, as well as the heavily urbanized coastal portions of Los Angeles County. A substantial portion of the water supply needed by the residents, businesses, and industries in the coastal areas comes from groundwater pumping. Similarly, major groundwater basins in the Santa Ana planning area serve the urbanized areas within it. Much of the pumping operations in the groundwater basins in these planning areas are limited by the courts via adjudication of water rights (DWR, 2013a).

To prevent seawater intrusion in coastal basins in Orange County, recycled water is injected into the ground to form a mound of groundwater between the coast and the main groundwater basin. In Los Angeles County, imported and recycled water is injected to maintain a seawater intrusion barrier.

3.5.2.3.1 Groundwater Quality

Groundwater quality in the south coast region has been degraded substantially from background levels, and much of the degradation reflects land use practices. For example, fertilizers and pesticides, typically used on agricultural lands, can degrade groundwater when irrigation-return waters containing such substances seep into the subsurface. In areas with failing or improperly sited septic systems, nitrogen, and pathogenic bacteria can seep into groundwater and result in health risks to those who rely on groundwater for domestic supply. In areas with industrial or commercial activities, above ground and underground storage tanks contain hazardous substances. Thousands of these tanks in the region have leaked or are leaking, discharging petroleum fuels, solvents, and other substances into the subsurface. These leaks as well as other discharges to the subsurface can seep into and pollute groundwater aquifers, which is often difficult, costly, and extremely slow to clean up (DWR, 2013a).

In the San Gabriel Valley and San Fernando Valley Groundwater Basins, volatile organic compounds (VOCs) from industry and nitrates from subsurface sewage disposal and past agricultural activities are the primary pollutants in these groundwater basins. These deep alluvial basins do not have a continuous effective confining layer above the groundwater, and as a result pollutants have seeped through the upper sediments into the groundwater. Approximately 20 percent of groundwater production capacity for municipal use in the San Gabriel Valley has been shut down as a result of this pollution. The Department of Toxic Substances Control (DTSC) has designated large areas of these basins as high-priority Hazardous Substances Cleanup sites and the U.S. EPA has designated these areas as Superfund sites. The RWQCB and U.S. EPA are overseeing investigations to further define the extent of pollution, identify the responsible parties, and begin remediation in these areas (DWR, 2013a)

Similar problems exist in the Bunker Hills sub-basin of the Upper Santa Ana River Basin where VOC and perchlorate groundwater contamination has been detected. Treatment plants are operating to remove VOC contamination. A number of wells and treatment plants to remove these contaminants are being operated in the cities of Redlands, Loma Linda, and Riverside (DWR, 2013a). Other areas with known groundwater contamination include Cherry Valley (northeast of Beaumont); the Chino Basin, Cucamonga, and Rialto Management Zones; and middle and lower portions of the Santa Ana River Basin (DWR, 2013a).

3.5.3 WATER DEMAND AND FORECAST

California's water-related assets and services are provided by many interdependent systems that historically have been managed on a project-by-project basis. The gap between water supplies and water demand decreased substantially between 2001 and 2010, meaning that the available water supplies have decreased while the demand for water has increased. This narrowing gap has been further exacerbated in Southern California by record low snowpack in the Sierra Nevada Mountains (Sierra Nevada) in 2013 and 2014 and severe drought conditions. There are typically three sources of supply water: (1) natural sources, (2) manmade sources, and (3) reclamation. Natural water sources include rivers, lakes, streams, and groundwater stored in aquifers. Manmade sources include runoff water that is treated and stored in reservoirs and other catchment structures. Reclaimed water is wastewater that has been conveyed to a treatment plant and then treated to a sufficient degree that it may again be used for certain uses (such as irrigation) (SCAG, 2016).

The water supply in Southern California comes from a variety of sources. While the MWD imports water from Colorado River and SWP and provides wholesale water supply to its coverage area, many cities and some county areas rely on groundwater, especially those along the coast. San

Bernardino and Riverside Counties, for example, rely on a mixture of groundwater and surface water (SCAG, 2016).

The increase in California's water demand is due primarily to the increase in population. By employing a multiple future scenario analysis, the California Water Plan Update 2009 (DWR, 2010) provides a growth range for future annual water demand. According to the California Water Plan Update 2009, statewide future annual water demands range from an increase of fewer than 1.5 million acre-feet (MAF)[1] for the Slow and Strategic Growth scenario, to an increase of about 10 MAF under the Expansive Growth scenario by year 2050. If Southern California maintains its share of 12 percent of the state's water demand, the region could be expected to require an additional 500,000 acre-feet by 2030 (SCAG, 2016).

Water demand forecasting is essential for planning total water requirements in MWD's service area. Water demand can be met with conservation, local supplies, or imported supplies. As a wholesale imported water supplier, MWD's long-term plans focus on the future demands for MWD's supplies. In order to project the need for resources and system capacity, MWD begins with a long-term projection of water demands. Total water demands include: 1) Municipal and Industrial (M&I); 2) Agricultural Demand; 3) Seawater Barrier Demand; and 4) Replenishment Demand (MWD, 2016).

Actual water demand in 2015 was 3.1 MAF, which is approximately the same as in 1980. This is due to a number of factors including an aggressive outreach campaign due the severe drought since 2012, advancement in conservation, and mandatory water use restriction. Of the estimated 3.1 MAF of total water use in 2015, agricultural water use was only about 99 thousand acre-feet (TAF). This is due to severe drought, water rate increases, and water use restrictions. By 2040, under average conditions, agricultural demand is expected to be about 160 TAF (MWD, 2016).

It is estimated that total water use from M&I will grow from an annual average of 3.0 MAF in 2015 to 3.8 MAF in 2040. All water demand projections assume normal weather conditions. Future changes in estimated water demand assume continued water savings due to conservation measures such as water savings resulting from plumbing codes, price effects, and the continuing implementation of utility-funded conservation programs. Water demand was greatly reduced in 2015 due to extraordinary response to statewide calls for a 25 percent reduction in water use in light of historic drought conditions. Regional water use is projected to increase slightly until 2020 as demands rebound towards more normal levels. Between 2020 and 2040, regional water use is expected to grow slowly as driven by population and economic growth while water use efficiency increases (MWD, 2106).

3.5.3.1 Water Suppliers

Southern California is served by many water suppliers, both retail and wholesale with MWD being the largest. Created by the California legislature in 1931, MWD serves the urbanized coastal plain from Ventura in the north, to the Mexican border in the south, to parts of the rapidly urbanizing counties of San Bernardino and Riverside in the east. MWD is a regional wholesaler that delivers water to 26 member public agencies – 14 cities, 11 municipal water districts, one county water

[1] One acre-foot of water is equal to approximately 325,851 gallons.

authority – which in turn provide water to more than 19 million people in Los Angeles, Orange, Riverside, San Bernardino, San Diego and Ventura counties (MWD, 2016a). The MWD provides water to about 90 percent of the urban population of Southern California.

MWD owns and operates an extensive water system including: the Colorado River Aqueduct, 16 hydroelectric facilities, nine reservoirs, 819 miles of large-scale pipes and five water treatment plants. Four of these treatment plants are among the ten largest plants in the world. MWD is the largest distributor of treated drinking water in the United States. The MWD imports water from the Feather River in Northern California and the Colorado River along the California/Arizona border to supplement local supplies. It also helps its member agencies develop water recycling, storage and other local resource programs to provide additional supplies and conservation programs to reduce regional demands (MWD, 2016a).

MWD currently delivers an average of 1.7 billion gallons of water per day to a 5,200-square-mile service area. Investments to maintain the reliability of imported supplies are complemented by an expansion of local supply development along with a reduction in demand through a variety of conservation and water-use efficiency initiatives (MWD, 2106b).

Over the past ten years, MWD's largest water customers are the San Diego County Water Authority (27 percent), City of Los Angeles (17 percent), and Municipal Water District of Orange County (MWDOC) (13 percent). Local supplies fluctuate in response to variations in rainfall. During prolonged periods of below normal rainfall, local water supplies decrease. Conversely, prolonged periods of above-normal rainfall increase local supplies. Sources of groundwater basin replenishment include local precipitation, runoff from the coastal ranges, and artificial recharge with imported water supplies. In addition to runoff, recycled water provides an increasingly important source of replenishment water for the region (MWD, 2016).

MWD monitors demographics in its service area since water demand is heavily influenced by population size, geographical distribution, variation in precipitation levels, and water conservation practices. In 1990, the population of MWD's service area was approximately 15.0 million people. By 2015, it had reached an estimated 18.7 million, representing almost half of the state's population. In the past, annual growth has varied from about 200,000 annually in the 1970s and early-to-mid-1980s to more than 300,000 annually in the late 1980s. Growth has generally averaged 120,000 persons per year during the last 10 years from 2006 to 2015. The latest demographic and economic projections for the region anticipate much lower growth into the future than was forecasted in 2010. Lower growth signifies slower increases in water demand, which has major implications for prudent planning and investment in future water supplies. The MWD service area is estimated to reach an estimated population of 20.1 million in 2025, 21.2 million by 2035, and 21.8 million by 2040 (MWD, 2016b).

Since 1980, water demands varied from 2.9 MAF in 1983 to nearly 4.2 MAF in 2007. In 2000, demands reached 3.9 MAF, surpassing the early peak level for the first time in a decade. Since 2000, demands reached a new peak level in 2007 with nearly 4.2 MAF. Since the peak demand in 2007, a decrease in demand was observed during the economic recession of 2008-2012. Starting in 2012, the severe drought in California led to a massive conservation campaign and water use restriction by the state, MWD, and local water agencies resulting in a decrease in demand in 2015

(MWD, 2016). A gradual increase in total estimated water demand is expected between 2020 and 2040 (see Table 3.5-2), and it is expected the water authorities will act appropriately to meet the demand.

TABLE 3.5-2

2020 – 2040 Projected Water Demand (MAF)

Water District	2020 Demand	2025 Demand	2030 Demand	2035 Demand	2040 Demand
MWD[a]	5.22	5.39	5.53	5.66	5.79
LADWP[b]	0.612	0.645	0.653	0.662	0.676
Antelope Valley/East Kern Water Agency[c]	0.084	0.086	0.087	0.087	N/A (e)
Castaic Lake Water Agency[d]	0.069	0.075	0.081	0.086	0.089
Coachella Valley Water District[e]	0.120	0.146	0.178	0.199	0.204
Crestline-Lake Arrowhead Water Agency[f]	0.0017	0.0018	0.0019	0.0019	0.0019
Palmdale Water Agency[g]	0.021	0.022	0.023	0.024	0.025
San Bernardino Valley Municipal[h]	0.243	0.258	0.272	0.286	0.299
Municipal Water District of Orange County[i]	0.483	0.515	0.517	0.515	0.515

Source: (a) MWD, 2016 (b) LADWP, 2016 (c) AVEK, 2016
(d) CLWA, 2016 (d) CVWD, 2016 (f) LACSD, 2016
(g) PWD, 2016 (h) SBVMWD, 2016 (i) MWDOC, 2016

In 2015, about 97 percent of the demands were used for municipal and industrial purposes, and three percent for agricultural purposes. The relative share of agricultural water use has declined due to urbanization and market factors, including the price of water. Agricultural water use accounted for 19 percent of total regional water demand in 1970, 12 percent in 1980, 10 percent in 1990, and 3.5 percent in 2010 (MWD, 2016).

A number of other water agencies also supply water into Southern California (see Table 3.5-2), with the Los Angeles Department of Water and Power (LADWP) and MWDOC being the next biggest suppliers. Since MWD is the major supplies approximately 75 percent of the water to Southern California, no further details of the other water suppliers will be discussed herein.

3.5.3.2 Water Uses

The South Coast Hydrologic Region is the most populous and urbanized area in the state. Most of the land use in the region is urban, however, other land uses include forest and a small amount of agricultural uses. Urban water users require more than 80 percent of the total water use in the region. Almost 75 percent of the urban water uses occurred in the Metropolitan Los Angeles and Santa Ana areas, with slightly more than 40 percent occurring in Metropolitan Los Angeles (DWR, 2103a). In some portions of the region, water users consume more water than is locally available, which has result in an overdraft of groundwater resources and increasing dependence on imported water supplies.

As a result of recent droughts, Southern California water users have generally become more water efficient. Municipal water agencies have been engaged in aggressive water conservation and efficiency programs to reduce per capita water demand. A variety of water-use efficiency programs have been implemented in the region. These include rebates and direct installation programs for high-efficiency toilets for residential and commercial customers, residential and commercial audit/surveys, and irrigation system audits for large landscape areas. Some are handled quite adequately by individual water agencies, while the daily operations of others are handled by regional wholesale agencies (DWR, 2013a). As a result of changes in plumbing codes, energy and water efficiency innovations in appliances, and trends toward more water efficient landscaping practices, urban water demand has become more efficient. A summary of water users in Southern California is provided in the following section.

3.5.3.2.1 Residential Water Use

While single-family homes are estimated to account for about 60 percent of the total occupied housing stock in 2015, they are responsible for about 77 percent of total residential water demands. This is consistent with the fact that single-family households are known to use more water than multifamily households (e.g., those residing in duplexes, triplexes, apartment buildings, and condo developments) on a per housing-unit basis. This is because single-family households tend to have more persons living in the household; they are likely to have more water-using appliances and fixtures; and they tend to have more landscaping (MWD, 2016).

3.5.3.2.2 Non-residential Water Use

Non-residential water use represented approximately 25 percent of the total M&I demands in MWD's service area in 2015. This includes water that is used by businesses, services, government, institutions (such as hospitals and schools), and industrial (or manufacturing) establishments. Within the commercial/institutional category, the top water users include schools, hospitals, hotels, amusement parks, colleges, laundries, and restaurants. In Southern California, major industrial users include electronics, aircraft, petroleum refining, beverages, food processing, and other industries that use water as a major component of the manufacturing process (MWD, 2016).

3.5.3.2.3 Agricultural Water Use

In 2015, agricultural water use comprised about three percent of total regional water demand in MWD's service area. The relative share of agricultural water use has declined due to urbanization and market factors, including the price of water. Agricultural water use accounted for 19 percent of total regional water demand in 1970, 12 percent in 1980, 10 percent in 1990, and 3.5 percent in 2010 (MWD, 2016).

3.5.4 WATER SUPPLY

The region has a diverse mix of both local and imported water supply sources. Local water sources include water recycling, groundwater storage and conjunctive use, conservation, brackish water desalination, water transfer and storage, and infrastructure enhancements. The region imports water through the SWP, the Colorado River Aqueduct, and the Los Angeles Aqueduct. These resources allow the region flexibility in managing supplies and resources in wet and dry years (DWR, 2013a)

To meet current and growing demands for water, the South Coast Hydrologic Region is leveraging all available water resources: imported water, water transfers, conservation, local surface water, groundwater, recycled water, and desalination. Given the level of uncertainty about water supply from the Delta and the Colorado River, local agencies have emphasized diversification. Local water agencies have always utilized a mixture of local and imported waters and water management strategies to adequately meet urban and agricultural demands each year. This diverse mix of sources provides flexibility in managing resources in wet and dry years (DWR, 2013a).

Water used in MWD's service area comes from both local and imported sources. Local sources include groundwater, surface water, and recycled water. Sources of imported water include the Colorado River, the SWP, and the Owens Valley/Mono Basin. On average over the last ten years (from 2006 to 2015), local sources met about 45 percent of the water needs, while imported sources supplied the remaining 55 percent (MWD, 2016).

The City of Los Angeles imports water from the Owens Valley/Mono Basin east of the Sierra Nevada through the Los Angeles Aqueduct. This water currently meets about four percent of the region's water needs based on a ten-year average from 2006 to 2015, but is dedicated for use by the City of Los Angeles. MWD provides imported water supplies to meet the remaining 51 percent of the region's water needs based on the same ten-year period. These imported supplies are received from MWD's Colorado River Aqueduct (CRA) and the SWP's California Aqueduct.

3.5.4.1 Imported Water Supplies

Water is brought into the South Coast Hydrologic Region from three major sources: the Delta, Colorado River, and Owens Valley/Mono Basin. All three are facing water supply cutbacks because of climate change and environmental issues. Although imported water supplies historically served to help the South Coast Hydrologic Region grow, imported supplies are now relied on to sustain the existing population and economy. As such, parties in the South Coast Hydrologic Region are working closely with other regions, the state, and various federal agencies to address the challenges facing these imported supplies. Meanwhile, the South Coast Hydrologic Region is working to develop new local supplies to meet the needs of future population and economic growth.

DWR administers long-term imported water supply contracts with 29 agencies for SWP supplies. In return for State financing, operation, and maintenance of SWP facilities, the agencies contractually agree to repay all associated capital and operating costs. LADWP owns and operates the Los Angeles Aqueduct for conveyance of imported water from the Owens Valley to Los Angeles. Legal decisions regarding environmental concerns in the Delta have recently limited the volume of water that can be delivered south of the Delta through the SWP (DWR, 2013a).

The Colorado River is managed and operated by the U.S. Department of the Interior Bureau of Reclamation under numerous compacts, federal laws, court decisions and decrees, contracts, and regulatory guidelines collectively known as the “Law of the River.” This collection of documents gives entitlements to the water and regulates the use and management of the Colorado River among the seven basin states and Mexico. The MWD, the largest SWP contractor and primary South Coast Hydrologic Region wholesaler, delivers an average of 1.4 MAF of SWP and CRA supplies (depending on the availability of surplus water) to its 26 cities and member agencies.

The South Coast Hydrologic Region is served by many water suppliers, both retail and wholesale; the largest of these agencies is MWD. MWD serves the urbanized coastal plain from Ventura to the Mexican border in the west to parts of the rapidly urbanizing counties of San Bernardino and Riverside in the east. MWD provides water to about 90 percent of the urban population of Southern California (SCAG, 2016).

3.5.4.1.1 State Water Project (SWP)

The SWP supplies water to Southern California via the California Aqueduct, with delivery points in Los Angeles, San Bernardino, and Riverside Counties. Much of the SWP water supply passes through the San Francisco-San Joaquin Bay-Delta (Bay-Delta). The SWP consists of a series of pump stations, reservoirs, aqueducts, tunnels, and power plants operated by DWR. This statewide water supply infrastructure provides water to 29 urban and agricultural agencies throughout California. More than two-thirds of California’s residents obtain some of their drinking water from the Bay-Delta.

The SWP was constructed and is managed by DWR, and is the largest state-owned, multipurpose water project in the country. SWP contractors in the region take delivery of and convey the supplies to regional wholesalers and retailers. Contractors in the region include the MWD, Castaic Lake Water Agency (CLWA), San Bernardino Valley Municipal Water District (SBVMWD), San Gorgonio Pass Water Agency (SGPWA), and San Gabriel Valley Municipal Water District (DWR, 2013a) SWP has historically provided 25 to 50 percent of MWD’s water, anywhere from 450,000 acre-feet to 1.75 MAF annually. Southern California's maximum SWP yield is about 2.0 MAF per year. The SWP provides water to approximately 25 million people and irrigation water for roughly 750,000 acres of agricultural lands annually (SCAG, 2016).

In 2007, a federal judge ordered the pumps that bring water from the Sacramento Bay Delta into Southern California be shut off, to protect an endangered fish species, the Delta smelt. Although pumping later resumed, it did so at only two-thirds of capacity, reducing by one-third the amount of water coming into Southern California through that system. It is unclear when, or even if, full capacity pumping will resume. The situation in the Sacramento Bay Delta highlights the uncertainty and vulnerability of the region's dependence on imported water (SCAG, 2016).

Another important concern for MWD is sustained improvement in SWP water quality. MWD must be able to meet the increasingly stringent drinking water regulations that are expected for disinfection by-products and pathogens in order to protect public health. Meeting these regulations will require improving the Bay-Delta water supply by cost effectively combining alternative source waters, source improvement, and treatment facilities. Additionally, MWD requires water quality improvements of Bay-Delta water supplies to meet its 500 mg/L salinity blending objective in a cost-effective manner, while minimizing resource losses and helping to ensure the viability of regional recycling and groundwater management programs (MWD, 2016).

In July 2015, DWR released the 2015 SWP Delivery Capability Report. The 2015 Delivery Capability Report provides estimates of the current (2015) and future (2035) SWP delivery capability for each SWP contractor under a range of hydrologic conditions. These estimates incorporate regulatory requirements in accordance with U.S. Fish and Wildlife Service and National Fisheries Service biological opinions. In addition, these estimates of future capability also reflect potential impacts of climate change and sea level rise.

MWD's implementation approach for the SWP depends on the full use of the current State Water Contract provisions, including its basic contractual amount. In addition, it requires successful negotiation and implementation of a number of water agreements. MWD is committed to working collaboratively with DWR, SWP contractors, and other stakeholders to ensure the success of these extended negotiations and programs (MWD, 2016).

3.5.4.1.2 Colorado River System

The Colorado River is a major source of water for the region and is imported via the Colorado River Aqueduct. The Colorado River Region is of particular concern because it encompasses the Coachella Valley in the West Basin and the desert in the East Basin. Irrigation needs in the Coachella Valley are met almost exclusively by water imported from the Colorado River. Historical extraction of groundwater in the Coachella Valley has caused overdraft. Currently, an extensive groundwater recharge project is being undertaken by the Coachella Valley Water District that recharges Colorado River Water into spreading basins. Within the East Basin, irrigation and domestic water is provided by the Colorado River with only approximately one percent groundwater use and little direct reclamation. Agricultural runoff and some domestic wastewater do get returned to the Colorado River. Therefore, the water source at the southern end of the watershed is actually a mixture of Colorado River water, agricultural runoff, and reclaimed water (SCAG, 2016).

Under water delivery contracts with the United States, California entities have enjoyed legal entitlements to Colorado River water since the early twentieth century. California water agencies have a legal entitlement of 4.4 MAF annually of Colorado River water, as well as any surplus. Of the 4.4 MAF of water, 3.85 MAF are assigned in aggregate to agricultural users; MWD's annual entitlement is 550,000 acre-feet. There have been several compacts, treaties, and negotiations between the seven states the use Colorado River, beginning with the 1922 Colorado River Compact. MWD is the fourth priority for Colorado River supplies (see Table 3.5-3).

The MWD diverts Colorado River supplies based on the agreements in the 1931 California Seven-Party Agreement and the Colorado River Water Delivery Agreement: Federal Quantification Settlement Agreement of 2003, which further quantifies priorities established in the 1931 document. Table 3.5-3 shows the historic apportionment of each agency, and the priority accorded that apportionment. The MWD diversions, within its legal entitlements, are less now than they were in the early 2000s. Surplus supplies, which existed on the river then, have been reduced as other states have increased their diversions in accord with their authorized entitlements.

TABLE 3.5-3

Priorities of the Seven Party Agreement

Priority	Description	TAF[a] Annually
1	Palo Verde Irrigation District – gross area of 104,500 acres of land in the Palo Verde Valley	3,850
2	Yuma Project (Reservation Division) – not exceeding a gross area of 25,000 acres in California	N/A[b]
3[c]	Imperial Irrigation District and land in Imperial and Coachella Valleys to be served by All American Canal	N/A
3[d]	Palo Verde Irrigation District—16,000 acres of land on the Lower Palo Verde Mesa	N/A
4	MWD of Southern California for use on the coastal plain of Southern California	550
Subtotal		**4,400**
5(a)	MWD of Southern California for use on the coastal plain of Southern California	550
5(b)	MWD of Southern California for use on the coastal plain of Southern California	112
6(a)	Imperial Irrigation District and land in Imperial and Coachella Valleys to be served by the All American Canal	300
6(b)	Palo Verde Irrigation District—16,000 acres of land on the Lower Palo Verde Mesa	N/A
7	Agricultural Use in the Colorado River Basin in California	
	Total Prioritized Appointment	**5,362**

Source: MWD, 2016
(a) TAF = thousand acre-feet.
(b) N/A = Not Available
(c) The Coachella Valley Water District now serves Coachella Valley

(d) In 1946, the City of San Diego, the San Diego County Water Authority, MWD, and the Secretary of the Interior entered into a contract that merged and added the City of San Diego's rights to store and deliver Colorado River water to the rights of MWD. The conditions of that agreement have long since been satisfied.

With increased urbanization in the Colorado River Basin states and limitation agreements between those states, surplus water for California was eliminated; the state will gradually return to its original allotment of 4.4 MAF. Given these new terms, California water agencies are pursuing various strategies to offset this gradual, but certain loss of future water supply. Examples of these strategies include additional reservoir and storage agreements, new water transfers between agricultural and urban users, and more water conservation and recycling. A record eight-year drought in the Colorado River Basin has reduced current reservoir storage throughout the river system to just over 50 percent of the total storage capacity (SCAG, 2016).

3.5.4.1.3 Owens Valley Mono Basin (Los Angeles Aqueduct)

High-quality water from the Owens Valley/Mono Basin is delivered through the Los Angeles Aqueduct to the City of Los Angeles. Construction of the original 233-mile aqueduct from the Owens Valley was completed in 1913, with a second aqueduct completed in 1970 to increase capacity. These two aqueducts have historically supplied an average of approximately 256,000 acre-feet per year in normal years, and as little as 106 acre-feet per year in drier years. Recent deliveries have been almost cut in half due to dwindling Sierra snowpack and a court decision restricting the amount of water that can be removed from the Owens Valley/Mono Basin in order to restore their damaged ecosystems (SCAG, 2016).

Since its construction the Los Angeles Aqueduct historically provided the vast majority of water for the City of Los Angeles. Annual Los Angeles Aqueduct deliveries are dependent on snowfall in the eastern Sierra Nevada. Years with abundant snowpack result in larger water deliveries from the Los Angeles Aqueduct, and typically reduced purchases of supplemental water from MWD. Conversely, low Los Angeles Aqueduct deliveries in dry years increase the demand for supplemental water from MWD. The impact to Los Angeles Aqueduct water supplies due to varying hydrology in the Owens Valley/Mono Basin is amplified by the requirements to release water for environmental enhancement efforts in the eastern Sierra Nevada.

The cyclical nature of hydrology is exhibited best by Los Angeles Aqueduct deliveries over the last fifteen years. This general period was characterized by a series of wet years, followed by a series of dry years that have extended into the current drought period. Beginning in 2012, a multiple-year drought impacted the entire State of California and Los Angeles Aqueduct deliveries reached a new record low of 53,500 acre-feet during fiscal year 2014/15. From fiscal 2010/11 through 2014/15, Los Angeles Aqueduct deliveries supplied an average of 29 percent of the city's water needs which is substantially lower than average aqueduct deliveries supplying 40 percent of the city's needs since fiscal year 1989/90. In the last decade environmental considerations have required that the city reallocate approximately 182,000 acre-feet per year (AFY) of Los Angeles Aqueduct water supply to environmental mitigation and enhancement projects leaving approximately 43 percent of the supply available for export to the city. Reducing water deliveries to the city from the Los Angeles Aqueduct to comply with environmental enhancement efforts coupled with the drought has led to increased dependence on imported water supply from MWD (LADWP, 2016).

3.5.4.2 Local Water Supplies

Approximately 50 percent of the region's water supplies come from resources controlled or operated by local water agencies. These resources include water extracted from local groundwater basins, catchment of local surface water, non-MWD imported water supplied through the Los Angeles Aqueduct, and Colorado River water exchanged for MWD supplies (MWD, 2016). Local sources of water available to the region include surface water, groundwater, and recycled water.

3.5.4.3 Surface Water

In addition to the groundwater basins, local agencies maintain surface reservoir capacity to capture local runoff. The average yield captured from local watersheds is estimated at approximately 104 TAF per year. The majority of this supply comes from reservoirs within the service area of the San Diego County Water Authority.

3.5.4.4 Groundwater

The groundwater basins that underlie the region provide nearly 35 percent of the water supply in Southern California. The major groundwater basins provide an annual average supply of approximately 1.35 MAF. Natural recharge of the groundwater basins is supplemented by active recharge of captured stormwater, recycled water, and imported water to support this level of annual production.

Estimates indicate that available storage space in the region's groundwater basins in mid-2015 is approximately 4.8 MAF. Successive dry years have resulted in groundwater depletions that will need to be replaced with natural recharge during wet years and active spreading of captured stormwater, recycled water, and imported water. Groundwater basin managers and water suppliers have taken steps to store water in advance of dry years to soften the potential impact on groundwater aquifers and to maintain reliable local water supplies during dry years (MWD, 2016).

3.5.4.5 Recycled Water

Recycled water has been successfully used in the South Coast Hydrologic Region since the 1960s. Although it meets only a small fraction of the overall demands, recycled water supplies are being used in Southern California. Key factors in the continued increases in use include the upgrades of existing and construction of new wastewater treatment facilities with the latest technology to treat and produce these supplies and the continued expansion of the local infrastructures to store and convey the supplies to potential users, primarily for landscape irrigation. In Los Angeles County, recycled water is also recharged into the Central and West Coast Basins via the county flood control district's spreading grounds and injection wells that form the district's seawater barrier projects (DWR, 2013a).

Additionally, the Los Angeles RWQCB adopted Non-Irrigation General Water Reuse (Order No. R4-2009-0049) General Waste Discharge and Water Recycling Requirements for Title 22 Recycled Water for Non-Irrigation Uses over the Groundwater Basins Underlying the Coastal

Watersheds of Los Angeles and Ventura Counties. The purpose of this General Waste Discharge Requirement (WDR) is to serve as a region-wide general permit for non-irrigation uses of recycled water, such as industrial cooling or dust control during construction.

Recycled water use in the South Coast Hydrologic Region (354,000 acre-feet) was determined by the 2009 Recycled Water Survey. This accounts for more than 7.5 percent of the total applied water (4.7 MAF) in the region. Almost one-third of the recycled water is used to augment or protect groundwater resources either by spreading basins for groundwater recharge or coastline injection to act as a barrier to saltwater intrusion. Landscape irrigation, agricultural irrigation, and industrial use are also significant uses of recycled water.

Recycled water is produced and used by dozens of cities and agencies throughout the South Coast Hydrologic Region, with the primary producers being the Sanitation Districts of Los Angeles County, the City of Los Angeles, and Orange County Water District (OCWD). These producers, as well as other recycled water producers in the region, are continuing to expand capacity and planning for uses of existing supplies (DWR, 2013a).

3.5.4.6 Desalination Plants

Multiple groundwater desalination facilities are in operation in the South Coast Hydrologic Region. In the Santa Ana planning area, the Chino Desalter Authority operates the Chino I and Chino II facilities; Eastern Municipal Water District operates Menifee and Perris I; the city of Riverside has Arlington; and the city of Corona has Temescal. The Irvine Desalter is a joint project between the Irvine Ranch Water District and OCWD; and the 17th Street Desalter is a project between the City of Tustin, OCWD, and MWD.

In Metropolitan Los Angeles, there is the West Basin Municipal Water District's Goldsworthy Desalter. In San Diego County, the city of Oceanside operates the Mission Basin Groundwater Purification Facility, and the Sweetwater Authority operates the Reynolds Groundwater Desalination Facility. Additionally, the Southwest Water Company operates the San Juan Capistrano Groundwater Recovery Plant.

A seawater desalination project is moving forward in the South Coast Hydrologic Region. The Carlsbad Desalination Plant in San Diego County, and the conveyance system needed to deliver the desalted water to consumers, are under construction by Poseidon Resources, a private company. This facility will be able to produce up to 50 million gallons per day (mgd) of potable water supplies to SDCWA member water agencies (DWR, 2013a). Poseidon is currently seeking permits for a 50 million gallon per day desalination plant in Huntington Beach.

3.5.4.7 Drought

California's most recent statewide drought in water years 2007-2009 was followed by near average hydrologic conditions in water year 2010, and a wet year in 2011. Water year 2012 was the first generally dry year statewide since the last drought. Water year 2013 was one of the driest on record. California received its full basic interstate apportionment of Colorado River water throughout this period. In response to the widespread Midwestern drought in the summer of 2012, the U.S. Department of Agriculture (USDA) streamlined its methodology for the USDA Secretary to make county level drought disaster designations. The new methodology is based on counties' short-term status as depicted in the U.S. Drought Monitor, which primarily relies on precipitation and soil moisture conditions at a weekly time scale, and is essentially independent of any characterization of drought impacts. Application of the new methodology nationwide resulted in almost all of California's counties automatically receiving drought disaster designations in 2012.

Scientific capability for intraseasonal to interannual climate forecasting (ISI forecasting) remains unreliable. Since 2008, DWR has annually funded an experimental research forecast for the coming winter season. This forecast, like the NOAA Climate Prediction Center's seasonal outlook, can be used to explore research approaches associated with ISI forecasting, but it is not suitable for decision-making. A single dry year, such as 2012, is a reminder of the need to prepare for the possibility that the following year may also be dry, in which case the impacts of dry conditions will likely be more pronounced (DWR, 2013).

Water years 2012 and 2013 were dry statewide, especially in parts of the San Joaquin Valley and Southern California. Water year 2014, which began October 1, 2013, continues this trend. Precipitation in some areas of the state is tracking at about the driest year on record. On January 17, 2014, a drought state of emergency was declared and State officials were directed to take all necessary actions in response.

Immediately thereafter, DWR announced several actions to protect Californians' health and safety from more severe water shortages. Those actions include dropping the anticipated allocation of water to customers of the SWP from five percent to zero; notifying long-time water rights holders in the Sacramento Valley that they may be cut by 50 percent, depending on future snow survey results; and asking the SWRCB to adjust requirements that hinder conservation of currently stored water. This marks the first zero allocation announcement for all customers of the SWP in the 54-year history of the project.

State officials were directed to take all necessary actions to prepare for water shortages. California Department of Forestry and Fire Protection (CAL FIRE) recently announced it hired additional firefighters to help address the increased fire threat, the Department of Public Heath identified and offered assistance to communities at risk of severe drinking water shortages, and DFW restricted fishing on some waterways owing to low water flows that have become much worse during the drought. Also in January, the California Natural Resources Agency (CNRA), CalEPA, and the California Department of Food and Agriculture released the California Water Action Plan, which will guide state efforts to enhance water supply reliability, restore damaged and destroyed ecosystems, and improve the resilience of the infrastructure.

All Californians were asked to voluntarily reduce their water usage by 20 percent and the Save Our Water campaign has announced four new public service announcements that encourage residents to conserve. In December 2012, the governor formed a Drought Task Force to review expected water allocations and California's preparedness for water scarcity. In May 2013, an executive order was issued to direct State water officials to expedite the review and processing of voluntary transfers of water.

In many areas of the state, drought conditions also mean a shift toward greater reliance on groundwater to meet agricultural demands. The drought-related increase in groundwater demand also resulted in a large increases in well drilling and installation. Installation of large capacity production wells in 2008 and 2009 were the highest since 1991 — another critically dry year (DWR, 2013).

3.5.5 WATER CONSERVATION

MWD's water conservation programs focus on two main areas: (1) residential water use, and (2) commercial, industrial, and institutional water use. MWD directly implements regional programs, and provides financial support for local programs that are implemented by the member agencies. MWD's Water Use Efficiency team provides program development, implementation, administration, monitoring, evaluation, and research (MWD, 2016).

Demand management through conservation is a core element of MWD's long-term water management strategy. Conservation has resulted in the replacement of more than 3.4 million toilets with more water efficient models, distribution of more than 530,000 high-efficiency clothes washers, and removal of approximately 170 million square feet of grass from both commercial and residential properties. Collectively, MWD's conservation programs and other conservation in the region is expected to reduce Southern California's reliance on imported water by more than 1.0 MAF per year by 2025 (MWD, 2016).

Conservation savings result from active, code-based, and price-effect conservation efforts. Active conservation consists of water-agency funded programs such as rebates and incentives for water efficient fixtures and equipment and turf removal. Code-based and price-based conservation consists of demand reductions attributable to conservation-oriented plumbing codes and usage reductions resulting from increases in the price of water. MWD does not currently assign a savings value for public awareness campaigns and conservation education because any initial effect on demand reduction and the longevity of the effect are difficult to measure. It is generally accepted that these outreach programs prompt consumers to install water saving fixtures and change water-use behavior, thereby creating a residual benefit of increasing the effectiveness of complementary conservation programs (MWD, 2016).

MWD's approach for achieving the conservation target includes implementing a suite of demand management measures, including public education and outreach, a variety of conservation programs, metering, research and development, and asset management. These programs include cost-effective conservation programs and new, innovative programs that address regional water uses. MWD also provides support to member agencies for local programs that assist with implementing BMPs and reducing per capita water use (MWD, 2016).

3.5.5.1 Residential Programs

MWD's residential conservation consists of the following programs:

- SoCal Water$mart: MWD provides a region-wide residential rebate program named SoCal Water$mart. Since its inception in 2008, rebate activity has increased dramatically as many residential customers became increasingly aware of the financial incentives available to them to help offset the purchase of water-efficient devices. To date, this program helped to replace over 3.3 million toilets, 530,000 washing machines, 37,000 urinals, 300,000 smart irrigation controllers, 2.3 million rotating nozzles, and hundreds of thousands of other devices and appliances.

- Residential Programs Administered by Member Agencies - MWD's member and retail agencies also implement local residential water conservation programs within their respective service areas and receive MWD incentives for qualified retrofits and other water-saving actions. Typical projects include high-efficiency toilet distributions, locally administered clothes washer rebate programs, turf removal programs, and residential water audits.

MWD has provided incentives on a variety of water efficient devices for the residential sector, including: 1) turf removal (residential); 2) high-efficiency clothes washers; 3) high-efficiency toilets; 4) rotating nozzles for sprinklers; and 5) irrigation controllers.

3.5.5.2 Commercial, Industrial and Institutional Programs

MWD's commercial industrial and institutional (CII) conservation consists of three major rebate and incentive programs:

- SoCal Water$mart - The majority of the commercial conservation activity comes from MWD's regional SoCal Water$mart program, which also extends rebates to multi-family properties. This program had its largest year in fiscal year 2014-15, providing CII rebates for about 328,000 product replacements.

- Water Savings Incentive Program – This program provides financial incentives for customized landscape irrigation and industrial process improvements. This program allows large-scale water users to create their own conservation projects and receive incentives for up to ten years of water savings for measured water-use efficiency improvements.

- Commercial Programs Administered by Member Agencies – Member and retail agencies also implement local commercial water conservation programs using MWD incentives. Projects target specific commercial sectors, with some programs also receiving assistance from state or federal grant programs. MWD incentives are also used as the basis for meeting cost-share requirements for the grants.

MWD's CII programs provide rebates for water-saving plumbing fixtures, landscaping equipment, turf removal, food-service equipment, cleaning equipment, heating, ventilation, air conditioning equipment, and medical equipment. Commercial devices that have contributed to projected conservation savings include:

- Connectionless Food Steamers
- Cooling Tower Conductivity Meters
- Dry Vacuum Pumps
- High-Efficiency Clothes Washers
- High-Efficiency Toilets
- High-Efficiency Urinals
- Ice Machines
- In-Stem Flow Regulators
- Large Rotors – High Efficiency Nozzles
- Multi Stream Rotating Nozzles
- pH Cooling Tower Controllers
- Plumbing Flow Control Valves
- Pre-rinse Spray Heads
- Steam Sterilizers
- Ultra-Low-Flush Toilets
- Ultra-Low-Flush Urinals
- Water Brooms
- Weather-Based Irrigation Controllers
- X-ray Processors
- Zero Water Urinals

In the City of Los Angeles, conservation has had a tremendous impact on water use patterns and has become a permanent part of LADWP's water management philosophy. Water conservation is at the core of multiple strategies to improve overall water supply reliability. In the future conservation will continue to be an important part of maintaining supply reliability and calling for a 25 percent reduction in per capita water use by 2035 over 2013 levels (LADWP, 2016).

Water usage in Los Angeles is about the same as it was in the 1970s despite an increase in population of more than 30 percent (over 1,000,000 additional people) based on installation of conservation devices subsidized through rebates and incentives. Cumulative annual hardware savings since the inception of LADWP's conservation program totals 118,034 AFY. Additional conservation has been achieved through changes in customer behavior and lifestyle.

As a result of mandatory conservation and reduced deliveries of imported water from MWD, residential customers have attained conservation levels exceeding 30 percent during the period between fiscal year 2006-07 and fiscal 2014-15. In response to the current water supply shortage, the City of Los Angeles has updated its Emergency Water Conservation Plan Ordinance's enforceable water waste provisions and mandatory outdoor watering restrictions. In addition, the city has implemented water shortage year rates reducing Tier 1 water allotments for customers by 15 percent. As a direct result of conservation, imported water purchases from MWD are well below baseline allocations for fiscal year 2014/15 (LADWP, 2016).

MWDOC committed to water use efficiency in 1991 by voluntarily signing the memorandum of understanding (MOU) Regarding Urban Water Conservation in the California Urban Water Conservation Council. The council was formed through adoption of this MOU and is considered the "keeper" of the BMPs, with the authority to add, change, or remove BMPs. The California Urban Water Conservation Council also monitors implementation of the MOU. As a signatory to the MOU, MWDOC has committed to a good-faith-effort to implement all cost-effective BMPs.

Retail water agencies throughout Orange County also recognize the need to use existing water supplies efficiently – implementation of BMP-based efficiency programs makes good economic sense and reflects responsible stewardship of the region's water resources. All retail water agencies in Orange County are actively implementing BMP-based programs; however, not all retail water agencies are signatory to the MOU. As a signatory to the California Urban Water Conservation Council MOU regarding urban water use efficiency, MWDOC's commitment to implement BMP-based water use efficiency program continues today (MWDOC, 2016).

3.5.6 WATER QUALITY

Water quality is a key issue in the South Coast Hydrologic Region. Population and economic growth not only affect water demand but add contamination challenges from increases in wastewater and industrial discharges, urban runoff, agricultural chemical usage, livestock operations, and seawater intrusion. Three RWQCBs have jurisdiction in the South Coast Hydrologic Region: Los Angeles RWQCB (Region 4), Santa Ana RWQCB (Region 8), and San Diego RWQCB (Region 9). Each RWQCB identifies impaired water bodies, establishes priorities for the protection of water quality, issues waste discharge requirements (WDRs), and takes appropriate enforcement actions within in its jurisdiction. Specific water quality issues include beach closures, contaminated sediments, agricultural discharges, salinity management, and port and harbor discharges (DWR, 2013a).

Major surface waters of the South Coast Hydrologic Region flow from head waters in pristine mountain areas (largely in two national forests and the Santa Monica Mountains), through urbanized foothill and valley areas, high density residential and industrial coastal areas, and terminate at highly utilized recreational beaches and harbors. Uncontrolled pollutants from non-point sources are believed to be the greatest threats to rivers and streams within the South Coast Hydrologic Region (SCAG, 2016). Table 3.5-4 lists Impaired Surface Water Bodies in the Basin.

3.5.6.1 Point and Non-Point Source Pollution

Portions of the Los Angeles River in Los Angeles County and the Santa Ana River in Orange County have been lined with concrete for flood control purposes. One of the effects of these projects has been to reduce the natural recharge of groundwater basins. A second has been to make these rivers conveyance systems that concentrate and transfer urban pollutants and waste to the ocean. With regard to the rivers themselves, the State's Water Quality Assessment Report estimated in 1992 that approximately two-thirds of California's water bodies were threatened or impaired by non-point sources of pollution. Point source pollution refers to contaminants that enter a watershed, usually through a pipe. The location of the end of the pipe is documented and the flow out of that pipe is subject to a discharge permits issued by an RWQCB. Examples of point source pollution are discharges from sewage treatment plants and industrial facilities. Because point sources are much easier to regulate than non-point sources, they were the initial focus of the 1972 CWA. Regulation of point sources since then has dramatically improved the water quality of many rivers and streams throughout the country. In contrast to point source pollution, non-point source pollution, also known as "pollution runoff," is diffuse. Non-point pollution comes from everywhere in a community and is significantly influenced by land uses. A driveway or the road in front of a house may be a source of pollution if spilled oil, leaves, pet waste or other contaminants leave the site and runoff into a storm drain. Non-point source pollution is now considered one of the major water quality problems in the United States (SCAG, 2016).

3.5.6.2 Runoff Pollutants

The problem of non-point source pollution is especially acute in urbanized areas where a combination of impermeable surfaces, landscape irrigation, highway runoff and illicit dumping increase the pollutant loads in stormwater. The SWRCB has identified the following pollutants found in urban runoff as being a particular concern:

- Sediment: Excessive sediment loads in streams can interfere with photosynthesis, aquatic life respiration, growth, and reproduction;

- Nutrients: Nitrogen and phosphorus can result in eutrophication of receiving waters (excessive or accelerated growth of vegetation or algae), reducing oxygen levels available for other species;

- Bacteria and viruses: Pathogens introduced to receiving waters from animal excrement in the watershed and by septic systems can restrict water contact activities;

- Oxygen demanding substances: Substances such as lawn clippings, animal excrement and litter can reduce dissolved oxygen levels as they decompose;

- Oil and grease: Hydrocarbons from automobiles are toxic to some aquatic life;

- Metals: Lead, zinc, cadmium and copper are heavy metals commonly found in stormwater. Other metals introduced by automobiles include chromium, iron, nickel and manganese. These metals can enter waterways through storm drains along with sediment, or as atmospheric deposition;

- Toxic pollutants: Pesticides, phenols and polynuclear aromatic hydrocarbons (PAHs) are toxic organic chemicals found in stormwater; and

- Floatables: Trash in waterways increases metals and toxic pollutant loads in addition to undesirable aesthetic impacts.

TABLE 3.5-4

Impaired Surface Water Bodies in the Basin (SCAG, 2016)

Pollutant	Impaired Water Body
Los Angeles	
Algae	Lindero Creek Reach 1
	Lindero Creek Reach 2 (Above Lake)
	Medea Creek Reach 1 (Lake to Confl. with Lindero)
	Medea Creek Reach 2 (Abv Confl. with Lindero)
	Ventura River Estuary
	Ventura River Reach 1 and 2 (Estuary to Weldon Canyon)
Ammonia	Calleguas Creek Reach 2 (estuary to Potrero Rd- was Calleguas Creek Reaches 1 and 2 on 1998 303d list)
	Calleguas Creek Reach 3 (Potrero Road upstream to confluence with Conejo Creek on 1998 303d list)
	Calleguas Creek Reach 6 (was Arroyo Las Posas Reaches 1 and 2 on 1998 303d list)
	Calleguas Creek Reach 7 (was Arroyo Simi Reaches 1 and 2 on 1998 303d list)
	Calleguas Creek Reach 9B (was part of Conejo Creek Reaches 1 and 2 on 1998 303d list)
	Calleguas Creek Reach 10 (Conejo Creek (Hill Canyon)-was part of Conejo Crk Reaches 2 & 3, and lower Conejo Crk/Arroyo Conejo N Fk on 1998 303d list)
	Calleguas Creek Reach 11 (Arroyo Santa Rosa, was part of Conejo Creek Reach 3 on 1998 303d list)
	Calleguas Creek Reach 12 (was Conejo Creek/Arroyo Conejo North Fork on 1998 303d list)
	Calleguas Creek Reach 13 (Conejo Creek South Fork, was Conejo Cr Reach 4 and part of Reach 3 on 1998 303d list)
	Coyote Creek
	Dominguez Channel (lined portion above Vermont Ave)
	Los Angeles River Reach 1 (Estuary to Carson Street)
	Los Angeles River Reach 2 (Carson to Figueroa Street)
	Los Angeles River Reach 3 (Figueroa St. to Riverside Dr.)
	Los Angeles River Reach 4 (Sepulveda Dr. to Sepulveda Dam)
	Los Angeles River Reach 5 (within Sepulveda Basin)
	San Jose Creek Reach 1 (SG Confluence to Temple St.)
	Santa Clara River Reach 3 (Freeman Diversion to A Street)
	Sepulveda Canyon
	Tujunga Wash (LA River to Hansen Dam)
Beach Closures	Robert H. Meyer Memorial Beach
Benthic-Macroinvertebrate Bioassessments	Arroyo Seco Reach 1 (LA River to West Holly Ave.)
	Compton Creek
	Las Virgenes Creek
	Malibu Creek
	Triunfo Canyon Creek Reach 2
	Walnut Creek Wash (Drains from Puddingstone Res)
Bis(2ethylhexyl)phthalate (DEHP)	Sawpit Creek

Table 3.5-4 (Cont.)

Impaired Surface Water Bodies in the Basin (SCAG, 2016)

Pollutant	Impaired Water Body
Boron	Calleguas Creek Reach 8 (was Tapo Canyon Reach 1)
	Fox Barranca (tributary to Calleguas Creek Reach 6)
	Santa Clara River Reach 11 (Piru Creek, from confluence with Santa Clara River Reach 4 to gaging station below Santa Felicia Dam)
Cadmium	Ballona Creek Estuary
Cadmium (sediment)	Ballona Creek
ChemA (tissue)	Calleguas Creek Reach 5 (was Beardsley Channel on 1998 303d list)
	Calleguas Creek Reach 9A (was lower part of Conejo Creek Reach 1 on 1998 303d list)
	Duck Pond Agricultural Drains/Mugu Drain/Oxnard Drain No 2
	Rio De Santa Clara/Oxnard Drain No. 3
Chloride	Piru Creek (from gaging station below Santa Felicia Dam to headwaters)
	Santa Clara River Reach 5 (Blue Cut gaging station to West Pier Hwy 99 Bridge) (was named Santa Clara River Reach 7 on 2002 303(d) list)
	Santa Clara River Reach 6 (W Pier Hwy 99 to Bouquet Cyn Rd) (was named Santa Clara River Reach 8 on 2002 303(d) list)
	Sespe Creek (from 500 ft below confluence with Little Sespe Cr to headwaters)
Cholrpyrifos (tissue)	Calleguas Creek Reach 4 (was Revolon Slough Main Branch: Mugu Lagoon to Central Avenue on 1998 303d list)
Coliform Bacteria	Arroyo Seco Reach 2 (West Holly Ave to Devils Gate Dam)
	Bell Creek
	Big Rock Beach
	Dan Blocker Memorial (Coral) Beach
	Las Flores Beach
	Leo Carillo Beach (South of County Line)
	Long Point Beach
	Los Angeles River Reach 6 (Above Sepulveda Flood Control Basin)
	Malibu Lagoon Beach (Surfrider)
	Palo Comado Creek
	Redondo Beach
	Rio Hondo Reach 1 (Confl. LA River to Snt Ana Fwy)
	Rio Hondo Reach 2 (At Spreading Grounds)
	San Gabriel River Reach 1 (Estuary to Firestone)
	San Gabriel River Reach 2 (Firestone to Whittier Narrows Dam
	San Jose Creek Reach 2 (Temple to I-10 at White Ave.)
	Santa Clara River Reach 7 (Bouquet Canyon Rd to above Lang Gaging Station) (was named Santa Clara River Reach 9 on 2002 303(d) list)
	Stokes Creek
	Topanga Beach
	Torrance Beach
	Torrance Carson Channel
	Verdugo Wash Reach 1 (LA River to Verdugo Rd.)
	Wilmington Drain
Copper	Aliso Canyon Wash
	Burbank Western Channel
	San Gabriel River Estuary

Table 3.5-4 (Cont.)

Impaired Surface Water Bodies in the Basin (SCAG, 2016)

Pollutant	Impaired Water Body
DDT (Dichlorodiphenyltrichloroethane)	Amarillo Beach
	Bluff Cove Beach
	Cabrillo Beach (Outer)
	Carbon Beach
	Castlerock Beach
	Escondido Beach
	Flat Rock Point Beach Area
	Inspiration Point Beach
	La Costa Beach
	Las Tunas Beach
	Malaga Cove Beach
	Malibu Beach
	Nicholas Canyon Beach
	Paradise Cove Beach
	Point Dume Beach
	Point Fermin Park Beach
	Portuguese Bend Beach
	Puerco Beach
	Royal Palms Beach
	Sea Level Beach
	Trancas Beach (Broad Beach)
	Ventura Marina Jetties
	Whites Point Beach
	Zuma Beach (Westward Beach)
DDT (sediment)	Abalone Cove Beach
Fecal Coliform	Canada Larga (Ventura River Watershed)
	Dry Canyon Creek
	McCoy Canyon Creek
Fish Barriers (Fish Passage)	Matilija Creek Reach 1 (Jct. With N. Fork to Reservoir)
	Matilija Creek Reach 2 (Above Reservoir)
Indicator Bacteria	Artesia-Norwalk Drain
	Avalon Beach
	Bull Creek
	Channel Islands Harbor Beach
	Coyote Creek, North Fork
	Dockweiler Beach
	Hermosa Beach
	Hobie Beach (Channel Islands Harbor)
	Long Beach City Beach
	Lunada Bay Beach
	Manhattan Beach
	Marina del Rey Harbor Beach
	Ormond Beach
	Peninsula Beach
	Point Vicente Beach
	Promenade Park Beach
	Puente Creek

Table 3.5-4 (Cont.)

Impaired Surface Water Bodies in the Basin (SCAG, 2016)

Pollutant	Impaired Water Body
	Resort Point Beach
	Rincon Beach
	San Antonio Creek (Tributary to Ventura River Reach 4)
	San Buenaventura Beach
	San Gabriel River Reach 3 (Whittier Narrows to Ramona)
	Santa Monica Beach
	Santa Monica Canyon
	Surfers Point at Seaside
	Venice Beach
	Ventura River Reach 3 (Weldon Canyon to Confl. w/ Coyote Cr)
	Will Rogers Beach
Invasive Species	Solstice Canyon Creek
Lead	Monrovia Canyon Creek
	Topanga Canyon Creek
	Triunfo Canyon Creek Reach 1
Nitrate and Nitrite	Brown Barranca/Long Canyon
	Mint Canyon Creek Reach 1 (Confl to Rowler Cyn)
	Torrey Canyon Creek
	Wheeler Canyon/Todd Barranca
Pathogens	Palo Verde Shoreline Park Beach
Pumping	Ventura River Reach 4 (Coyote Creek to Camino Cielo Rd)
Sulfates	Hopper Creek
	Pole Creek (trib to Santa Clara River Reach 3)
Toxicity	Santa Clara River Reach 1 (Estuary to Hwy 101 Bridge)
Trash	San Gabriel River, East Fork
	Verdugo Wash Reach 2 (Above Verdugo Road)
Santa Ana	
Ammonia (Unionized)	Bolsa Chica Channel
	Borrego Creek (from Irvine Blvd to San Diego Creek Reach 2)
	East Garden Grove Wintersburg Channel
	Serrano Creek
Cadmium	Cucamonga Creek Reach 1 (Valley Reach)
	Rathbone (Rathbun) Creek
	Santa Ana River Reach 6
Chemical oxygen demand (COD)	Chino Creek Reach 1B (Mill Creek confl to start of concrete lined channel)
Coliform bacteria	Chino Creek Reach 2 (Beginning of concrete channel to confl w San Antonio Creek)
Copper	
DDT (Dichlorodiphenyltrichloroethane)	Balboa Beach
	Peters Canyon Channel
Enterococcus	Newport Slough
	Seal Beach

Table 3.5-4 (Concluded)

Impaired Surface Water Bodies in the Basin (SCAG, 2016)

Pollutant	Impaired Water Body
Fecal Coliform	Buck Gully Creek
	Los Trancos Creek (Crystal Cove Creek)
	San Diego Creek Reach 1
Indicator Bacteria	Goldenstar Creek
	Morning Canyon Creek
	San Diego Creek Reach 2
	Santa Ana Delhi Channel
	Santa Ana River, Reach 2
	Temescal Creek, Reach 6 (Elsinore Groundwater sub basin boundary to Lake Elsinore Outlet)
Nutrients	Chino Creek Reach 1A (Santa Ana River R5 confl to just downstream of confl with Mill Creek)
	Grout Creek
	Mill Creek (Prado Area)
	Summit Creek
Pathogens	Knickerbocker Creek
	Lytle Creek
	Mill Creek Reach 1
	Mill Creek Reach 2
	Mountain Home Creek
	Mountain Home Creek, East Fork
	Santa Ana River, Reach 4
	Silverado Creek
PCB (Polychlorinated biphenyls)	Huntington Beach State Park
pH	Cucamonga Creek Reach 2 (Mountain Reach)
	San Antonio Creek
	Temescal Creek, Reach 1
Salinity/TDS/Chlorides	Santiago Creek, Reach 4

Source: SCAG, 2016

3.5.6.3 Salinity

The general quality of groundwater in the South Coast Hydrologic Region tends to be degraded as a result of land uses and water management practices. Fertilizers and pesticides typically used on agricultural lands infiltrate and degrade groundwater. Septic systems and leaking underground storage tanks can also impact groundwater. Overpumping can result in saltwater intrusion from the ocean, further degrading groundwater quality. In addition, wastewater discharges in inland regions can result in salt buildup from fertilizer and dairy waste.

To address the salinity problem, an increasing number of water agencies are working with other water, groundwater and wastewater agencies, state and local government agencies, and interested associations on researching and developing salinity management goals and action plans. Examples include the recently adopted Malibu Valley Groundwater Basin Salt and Nutrient Management Plan and the Central and West Coast Groundwater Basin Salt and Nutrient Management Plan.

Strategies currently in use include blending low and high salinity water and the desalination of brackish water based on recycled water guidance from the RWQCB (SCAG, 2016).

3.5.6.4 Perchlorate

Ammonium perchlorate is a primary ingredient of solid rocket propellant and is used in the manufacture of some types of munitions and fireworks. Ammonium perchlorate and other perchlorate salts are readily soluble in water, dissociating into the perchlorate ion that is highly mobile in groundwater. Small amounts of perchlorate have been found in the Colorado River with higher concentrations in a number of groundwater basins in Southern California. The primary human health concern related to perchlorate is its effects on the thyroid. While perchlorate cannot be removed using conventional water treatment, nanofiltration and reverse osmosis do work effectively, but at very high cost. Irvine Ranch Water District is using a fluidized bed biological treatment and is reinjecting the treated water back into the ground. A number of companies have developed an ion exchange process that removes perchlorate but creates hazardous waste brine. Nonetheless, a number of sites in Southern California have successfully installed ion exchange systems. Thus, while effective treatment options are available, the overriding consideration in decisions about whether to recover perchlorate contaminated groundwater is the cost effectiveness of available technologies (SCAG, 2016).

3.5.6.5 Total Organic Carbon (TOC) and Bromide

When source water containing high levels of TOC and bromide is treated with disinfectants such as chlorine or ozone, disinfection byproducts (DBPs) form. Studies have shown a link between certain cancers and DBP exposure. In addition, some studies have shown an association between reproductive and developmental effects and chlorinated water. In December 1998, the U.S. EPA adopted more stringent regulations for DPBs, especially in old industrial sites and Gateway Cities Corridor where historic use of disinfectants is having residual effects. Existing levels of TOCs and bromide in water supplies present challenges to agencies receiving water from the SWP to monitor and maintain safe drinking water supplies. A primary objective of the CALFED Bay-Delta Program (CALFED) is protection and improvement of the water quality of the SWP to ensure compliance with future drinking water regulations. Although exact future drinking water standards are unknown, significant source water protection of SWP water supplies will almost certainly be a necessary component of meeting these requirements cost-effectively (SCAG, 2016).

3.5.6.6 Methyl Tertiary Butyl Ether and Tertiary Butanol (MTBE)

The use of MTBE (and other oxygenates) in gasoline was mandated to achieve reductions in air pollution, including emissions of benzene, a known human carcinogen. However, this reduction in air pollution has been achieved at the expense of creating a serious groundwater and surface water problem. MTBE is very soluble in water and moves quickly into the groundwater. It is introduced into surface water bodies from the motor exhausts of recreational watercraft. MTBE is also resistant to chemical and microbial degradation in water, making treatment more difficult than the treatment of other gasoline components. MTBE presents a significant problem for local groundwater basins. Leaking underground storage tanks and poor fuel handling practices at local gas stations may provide a large source for MTBE. One gallon of MTBE alone (11 percent MTBE by volume) is enough to contaminate about 16.5 million gallons of water at 5 µg/L.

Such contamination has caused some water agencies to close wells. The City of Santa Monica, for example, lost about 50 percent of its production wells as a result of MTBE contamination during the 1990s. A combination of advanced oxidation processes followed by granular activated carbon has been found to be effective in reducing the levels of MTBE contaminants by 80 to 90 percent. This may make it possible for local water agencies to treat their groundwater sources to comply with water quality standards. The cost of such treatment, however, could cause some agencies to increase imports as a means of avoiding this cost (SCAG, 2016).

3.5.7 WASTEWATER TREATMENT

The CWA requires wastewater treatment facilities discharging to waters of the U.S. to provide a minimum level of treatment commonly referred to as tertiary treatment. Modern wastewater treatment facilities consist of staged processes with the specific treatment systems authorized through NPDES permits. Primary treatment generally consists of initial screening and clarifying. Primary clarifiers are large pools where solids in wastewater are allowed to settle out over a period of hours. The clarified water is pumped into secondary clarifiers and the screenings and solids are collected, processed through large digesters to break down organic contents, dried and pressed, and either disposed of in landfills or used for beneficial agricultural applications. Secondary clarifiers repeat the process of the primary clarifiers further, refining the effluent.

Other means of secondary treatment include flocculation (adding chemicals to precipitate solids removal) and aeration (adding oxygen to accelerate breakdown of dissolved constituents). Tertiary treatment may consist of filtration, disinfection, and reverse osmosis technologies. Chemicals are added to the wastewater during the primary and secondary treatment processes to accelerate the removal of solids and to reduce odors. Hydrogen peroxide can be added to reduce odors and ferric chloride can be used to remove solids. Polymers are added to secondary effluent as flocculate. Chlorine is often added to eliminate pathogens during final treatment and sulfur dioxide is often added to remove the residual chlorine. Methane produced by the treatment processes can be used as fuel for the plant's engines and electricity needs. Recycled water must receive a minimum of tertiary treatment in compliance with DHS regulations. Water used to recharge potable groundwater supplies generally receives reverse osmosis and microfiltration prior to reuse. Microfiltration technologies have improved substantially in recent years and have become more affordable. As levels of treatment increase, greater volumes of solids and condensed brines are produced. These by-products of water treatment are disposed of in landfills or discharged to local receiving waters.

Treated wastewater is generally discharged into a water body, evaporation pond or percolation basin, or used for irrigation of farmland and landscaping. The U.S. EPA's NPDES permit program areas affect how a municipality handles its sanitary wastewater. Tertiary treatment, which involves the removal of nutrients and nearly all suspended organic matter from wastewater, is now commonly required for discharges to bodies of water, particularly where there is potential for human contact. Municipalities rely on assistance from other partners, such as industry, developers, and homeowners, to ensure that they can meet the requirements contained in their municipal

NPDES permits. Properly managed municipal facilities, such as publicly owned treatment works (POTWs), and wastewater systems, such as separate and combined storm sewer systems, play an important role in protecting community health and local water quality (SCAG, 2016).

There are 66 major wastewater treatment facilities that serve the SCAG region (see Table 3.5-5). Several smaller municipal wastewater systems and agencies also serve incorporated cities within Southern California. Where municipal wastewater systems are absent, permits are available for private onsite sewage disposal systems. Most of the major wastewater treatment facilities are located in areas of higher population density. Many of the major facilities are located along the coastline to provide a close proximity of a water body for discharge of the treated water (SCAG, 2016).

TABLE 3.5-5

Active Wastewater Treatment Facilities in the Basin

County	Design Flow (mgd)
Los Angeles	**1,238.8**
Avalon Wastewater Treatment Plant	1.2
Burbank Water Reclamation Plant	12.5
Donald C. Tillman Water Reclamation Plant	80
Edward C. Little Water Recycling Facility	5.2
Hyperion Treatment Plant	450
Joint Water Pollution Control Plant, Carson	400
Juanita Millender-McDonald Carson Regional Water Recycling Plant	1.2
Long Beach Water Reclamation Plant	25
Los Angeles – Glendale Water Reclamation Plant	20
Los Coyotes Water Reclamation Plant	37.5
Newhall Ranch	2
Pomona Water Reclamation Plant	15
San Jose Creek Water Reclamation Plant	100
Saugus Water Reclamation Plant	6.5
Tapia Water Reclamation Facility	16.1
Terminal Island Water Reclamation Plant	30
Valencia Water Reclamation Plant	21.6
Whittier Narrows Water Reclamation Plant, El Monte	15
Orange	**1,097.62**
City of San Clemente Water Reclamation Facility	38.78
El Toro Water District Water Recycling Plant	34.37
Irvine Desalter Project Shallow Ground Water Unit	34.37
IRWD Los Alisos Water Recycling Plant	34.37
Latham Treatment Plant	38.78
Michelson Water Recycling Plnat	33.5
Orange County Sanitation District Plant 1	332
Orange County Sanitation District Plant Plant 2	332

TABLE 3.5-5

Active Wastewater Treatment Facilities in the Basin (concluded)

Santa Margarita Water District Oso Creek Water Reclamation Plant	38.78
Santa Margarita Water District Chiquita Water Reclamation Plant	38.78
South Orange County Wastewater Authority Aliso Creek Ocean Outfall	34.37
South Orange County Wastewater Authority Coastal Treatment Plant	34.37
South Orange County Wastewater Authority Regional Treatment Plant	34.37
South Orange County Wastewater Authority San Juan Creek Ocean Outfall	38.78
Riverside	**128.4**
Beaumont Wastewater Treatment Plant No. 1	4
Coachella Sanitation Division Wastewater Treatment Plant	2.4
Coachella Valley Water District Wastewater Treatment Plant	7
Corona Water Reclamation Facility No. 1	11.5
Corona Water Reclamation Facility No. 3	1
Elsinore Valley Municipal Water District Water Recycling Facility	8
Riverside City Water Recycling Facility	46
Temescal Creek Outfall	26
Valley Sanitation District Wastewater Treatment Plant	8.5
County	**Design Flow (mgd)**
Western Riverside County Regional Wastewater Authority Water Recycling Facility	14
San Bernardino	**413**
Colton Water Recycling Facility	0
Colton/San Bernardino Secondary Treatment Plant, Rapid Infiltration-Extraction	40
Henry N. Wochholz Wastewater Treatment Facility	6.7
Inland Empire Utilities Agency Carbon Canyon Water Recycling Facility	84.4
Inland Empire Utilities Agency Regional Water Recycling Plant No. 1	84.4
Inland Empire Utilities Agency Regional Water Recycling Plant No. 4	84.4
Inland Empire Utilities Agency Regional Water Recycling Plant No. 5	84.4
Margaret H Chandler Water Reclamation Plant	4.5
Rialto Wastewater Treatment Plant	11.7
Victor Valley Wastewater Reclamation Authority Wastewater Treatment Plant	12.5
TOTAL	**1,911.3**

Source: SCAG, 2016

3.6 NOISE

The purpose of the 2016 AQMP is to address the federal 2008 8-hour ozone standard, the 2012 annual PM2.5 standard, and the 2006 24-hour PM2.5 standard, to satisfy the planning requirements of the federal CAA, and to provide an update on the strategy to meet the 1997 8-hour ozone NAAQS and 1979 1-hour ozone NAAQS. Some of the proposed control measures intended to improve overall air quality may have direct or indirect noise impacts associated with their implementation. This subsection describes the existing setting relate to noise within California and the South Coast Air Basin.

The environmental setting section describes the noise, and noise sources that are associated with construction activities in the Basin, where the Basin includes Orange County, and portions of Los Angeles, Riverside, and San Bernardino Counties.

Sound waves, traveling outward from a source, exert a sound pressure level (commonly called "sound level"), measured in decibels (dB). "Noise" is often defined as unwanted sound, and environmental noise is usually measured in "A-weighted" decibels, which is a decibel corrected for the variation in frequency response of the typical human ear at commonly-encountered noise levels. All noise levels discussed herein reflect A-weighted decibels. In general, people can perceive a two- to three-dB difference in noise levels; a difference of 10 dB is perceived as a doubling of loudness.

3.6.1 TERMINOLOGY USED IN NOISE ANALYSIS

Because all humans perceive and interpret sound differently, the types of sound which comprise noise are subjective. The objectionable nature of sound can be caused by its pitch or its loudness. Pitch of a tone or sound depends on the relative rapidity (frequency) of the vibrations by which it is produced. Loudness is the amplitude of sound waves combined with the reception characteristics of the ear. Amplitude may be compared with the height of an ocean wave. Technical acoustical terms commonly used in this section and Subchapter 4.6 in Chapter 4 are defined in Table 3.6-1.

Noise is a by-product of urbanization and there are numerous noise sources and receptors in an urban community. Noise is generally defined as unwanted sound. The range of sound pressure perceived as sound is extremely large. The decibel is the preferred unit for measuring sound since it accounts for these variations using a relative scale adjusted to the human range for hearing (referred to as the A-weighted decibel or dBA). The dBA is a method of sound measurement which assigns weighted values to selected frequency bands in an attempt to reflect how the human ear responds to sound. The range of human hearing is from 0 dBA (the threshold of hearing) to about 140 dBA which is the threshold for pain. Examples of noise and their dBA levels are shown in Figure 3.6-1.

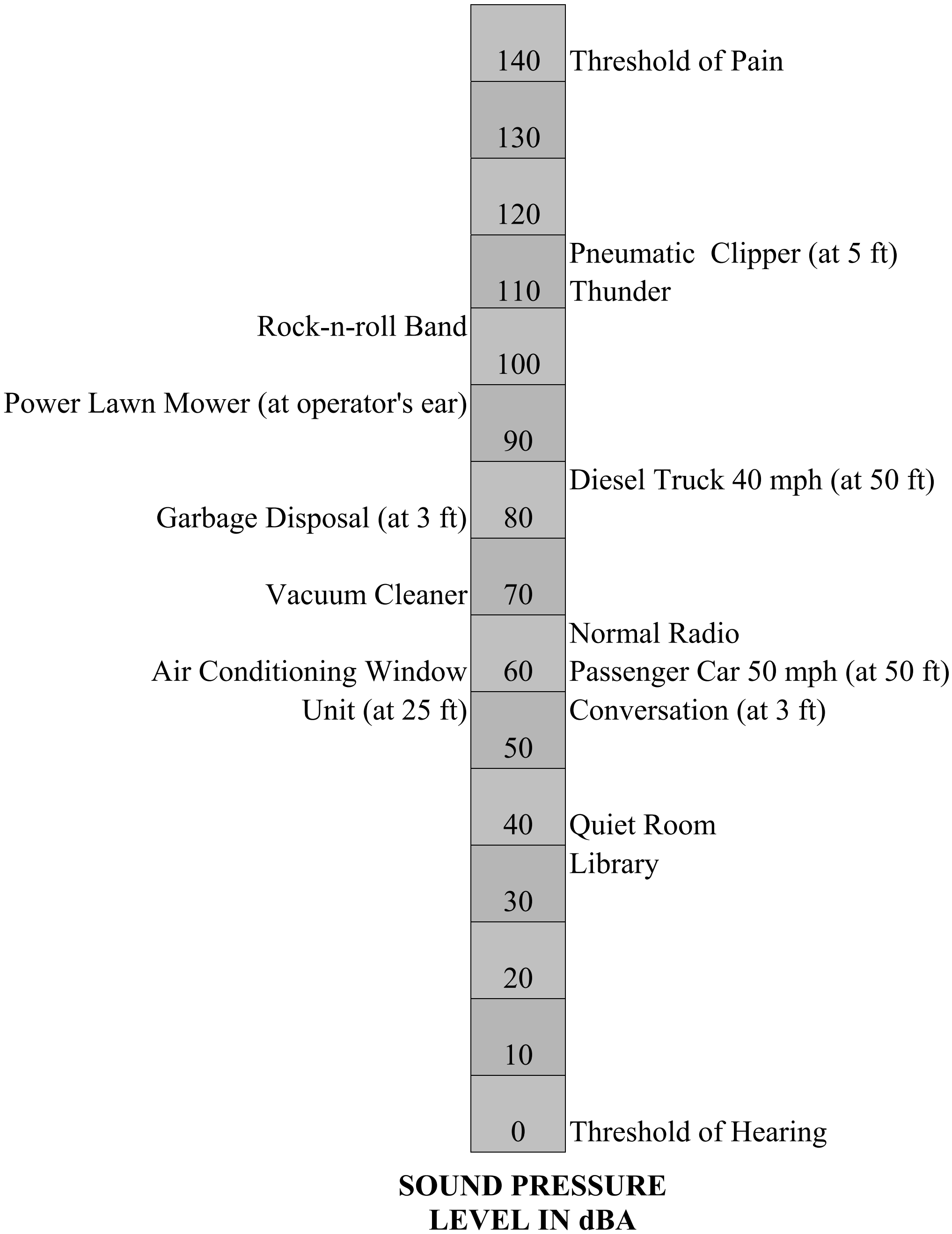
TABLE 3.6-1

Definition of Acoustical Terms

Term	Definition
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
A-Weighted Sound Level (dBA)	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Community Noise Equivalent Level (CNEL)	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and after addition of 10 decibels to sound levels in the night between 10:00 p.m. and 7:00 a.m.
Day/Night Noise Level (L_{dn})	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 p.m. and 7:00 a.m.
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20 micro Pascals.
Equivalent Noise Level (L_{eq})	The average A-weighted noise level during the measurement period.
Frequency (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sounds are below 20 Hz and ultrasonic sounds are above 20,000 Hz.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, time of occurrence, and tonal or informational content as well as the prevailing ambient noise level.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1 percent, 10 percent, 50 percent, and 90 percent of the time during the measurement period.
L_{max}, L_{min}	The maximum and minimum noise levels during the measurement period.
Loudness	The amplitude of sound waves combined with the reception characteristics of the human ear.
Pitch	The height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced.
Sound Exposure Level (SEL)	Sound Exposure Level is a measure of cumulative noise exposure of a noise event expressed as the sum of the sound energy over the duration of a noise event, normalized to a one-second duration.
Sound Pressure	Sound pressure or acoustic pressure is the local pressure deviation from the ambient atmospheric pressure caused by a sound wave. Sound pressure can be measured using a microphone. The unit for sound pressure (p) is the Pascal [symbol: Pa or 1 Newton exerted over an area of 1 square meter (N/m^2).
Sound Pressure Level	The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micro Pascals in air). Sound pressure level is the quantity that is directly measured by a sound level meter.
Vibration	Vibration means mechanical motion of the earth or ground, building, or other type of structure, induced by the operation of any mechanical device or equipment. The magnitude of vibration is stated as the acceleration in “g” units (1 g is equal to 32.2 feet/second^2 or 9.3 meters/second^2).

FIGURE 3.6-1

General Noise Sources and Associated Sound Pressure Levels



3.6.2 REGULATORY SETTING

The federal government sets noise standards for transportation-related noise sources that are closely linked to interstate commerce, such as aircraft, locomotives, and trucks; for those noise sources, the state government is preempted from establishing more stringent standards. The state government sets noise standards for those transportation noise sources that are not preempted from regulation, such as automobiles, light trucks, and motorcycles. Noise sources associated with industrial, commercial, and construction activities are generally subject to local control through noise ordinances and general plan policies.

3.6.2.1 Federal Agencies and Regulations

3.6.2.1.1 Code of Federal Regulations (CFR)

Federal regulations for railroad noise are contained in 40 CFR Part 201 and 49 CFR Part 210. The regulations set noise limits for locomotives and are implemented through regulatory controls on locomotive manufacturers. Federal regulations also establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under 40 CFR Part 205, Subpart B. The federal truck pass-by noise standard is 80 dB at 15 meters from the vehicle pathway centerline. These controls are implemented through regulatory controls on truck manufacturers. The Federal Highway Administration (FHWA) regulations for noise abatement must be considered for federal or federally-funded projects involving the construction of a new highway or significant modification of an existing freeway when the project would result in a substantial noise increase or when the predicted noise levels approach or exceed the "Noise Abatement Criteria."

Under the regulations, a "substantial increase" is defined as an increase in L_{eq} of 12 dB during the peak hour of traffic noise. The L_{eq} provides a time-weighted average of the noise measured. For sensitive uses, such as residences, schools, churches, parks, and playgrounds, the Noise Abatement Criteria for interior and exterior spaces is L_{eq} 57 and 66 dB, respectively, during the peak hour of traffic noise.

3.6.1.1.2 Federal Transit Administration (FTA)

The FTA has prepared guidance noise and vibration impacts assessments for proposed mass transit projects: Transit Noise and Vibration Impact Assessment (FTA Assessment) (U.S. FTA, 2006). The May 2006 version is the second edition of a guidance manual originally issued in 1995, which presented procedures for predicting and assessing noise and vibration impacts of proposed mass transit projects. The guidance is required to evaluate the noise and vibration impacts in environmental review process for project proponents seeking funding from FTA. All types of bus and rail projects are covered. The guidance contains procedures for assessing impacts at different stages of project development, from early planning before mode and alignment have been selected through preliminary engineering and final design. The focus is on noise and vibration impacts during operations, but construction impacts are also covered. The guidance describes a range of measures for controlling excessive noise and vibration.

3.6.2.1.3 Federal Aviation Administration (FAA)

Aircraft operated in the U.S. are subject to certain federal requirements regarding noise emissions levels. These requirements are set forth in Title 14 of the Code of Federal Regulations (14 CFR), Part 36. Part 36 establishes maximum acceptable noise levels for specific aircraft types, taking into account the model year, aircraft weight, and number of engines. Pursuant to the federal Airport Noise and Capacity Act of 1990, the FAA established a schedule for complete transition to Part 36 "Stage 3" standards by year 2000. This transition schedule applies to jet aircraft with a maximum takeoff weight in excess of 75,000 pounds and, thus, applies to passenger and cargo airlines but not to operators of business jets or other general aviation aircraft.

3.6.2.1.4 Federal Railroad Administration (FRA)

On March 24, 2009, the Federal Highway Administration (FHA) and the FTA issued final rule that modified FRA regulations to make certain changes mandated by the Safe, Accountable, Flexible, Efficient, Transportation, Equity Act: A Legacy for Users (SAFETEA-LU). The SAFETEA-LU prescribes requirements for environmental review and project decision making. This rule became effective April 23, 2009.

The FRA provides implementation procedures for predicting and assessing noise and vibration impacts of high-speed trains within their High-Speed Ground Transportation Noise and Vibration Impact Assessment. The document provides three levels of analysis, including a preliminary impact screening, a general assessment, and a detailed analysis, as well as a range of mitigation measures for dealing with adverse noise and vibration impacts. The report also includes noise criteria for potential impacts .

3.6.2.1.5 Department of Housing and Urban Development (HUD)

The noise regulation 24 CFR Part 51 Subpart B, Noise Abatement and Control presents the HUD noise program. Within the HUD Noise Assessment Guidelines, potential noise sources are examined for projects located within 15 miles of a military or civilian airport, 1,000 feet from a road or 3,000 feet from a railroad. HUD exterior noise regulations state that 65 dBA L_{dn} noise levels or less are acceptable for residential land uses and noise levels exceeding 75 dBA L_{dn} are unacceptable. HUD's regulations do not contain standards for interior noise levels. A goal of 45 decibels is set forth for interior noise and the attenuation requirements are based upon this level. HUD's standards assume that internal noise levels would be met if exterior standard are met under standard construction practices.

3.6.2.1.6 Federal Vibration Policies

The FRA and FTA have published guidance relative to vibration impacts. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings. The root mean square (RMS) amplitude is most frequently used to describe the effect of vibration on the human body. The RMS amplitude is defined as the average of the squared amplitude of the signal. The decibel notation, VdB, is commonly used to measure RMS. The decibel notation acts to compress the range of numbers required to describe vibration.

According to the FRA, fragile buildings can be exposed to groundborne vibration levels of 0.5 inches per second PPV without experiencing structural damage. The FTA has identified the human annoyance response to vibration levels as 80 VdB (U.S. FTA, 2006).

3.6.2.2 State Agencies and Regulations

3.6.2.2.1 California's Airport Noise Standards

The State of California's Airport Noise Standards, found in Title 21 of the California Code of Regulations, identify a noise exposure level of 65 dB CNEL as the noise impact boundary around airports. Within the noise impact boundary, airport proprietors are required to ensure that all land uses are compatible with the aircraft noise environment or obtain a variance for Caltrans.

3.6.2.2.2 California Department of Transportation (Caltrans)

Caltrans establishes noise limits for vehicles licensed to operate on public roads. For heavy trucks, the state pass-by standard is consistent with the federal limit of 80 dB. The state pass-by standard for light trucks and passenger cars (less than 4.5 tons gross vehicle rating) is also 80 dB at 15 meters from the centerline. For new roadway projects, Caltrans employs the Noise Abatement Criteria discussed above in connection with the FHWA.

3.6.2.2.3 California Noise Insulation Standards

The California Noise Insulation Standards found in the California Code of Regulations, Title 24, set requirements for new multi-family residential units, hotels, and motels that may be subject to relatively high levels of transportation-related noise. For exterior noise, the noise insulation standard is L_{dn} 45 dB in any habitable room and requires an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard where such units are proposed in areas subject to noise levels greater than L_{dn} 60 dB. L_{dn} is the average noise level over a 24 hour period. The noise between the hours of 10:00 p.m. and 7:00 a.m. is artificially increased by 10 dB. This takes into account the decrease in community background noise during nighttime hours.

3.6.2.2.4 State Vibration Policies

There are no adopted state policies or standards for ground-borne vibration. However, Caltrans recommends that extreme care be taken when sustained pile driving occurs within 7.5 meters (25 feet) of any building, and 15 to 30 meters (50 to 100 feet) of a historic building or a building in poor condition.

3.6.2.3 Local Agencies and Regulations

To identify, appraise, and remedy noise problems in the local community, each county and city within the SCAQMD has adopted a noise element as part of its General Plan. Each noise element is required to analyze and quantify current and projected noise levels associated with local noise sources, including, but not limited to, highways and freeways, primary arterials and major local streets, rail operations, air traffic associated with the airports, local industrial plants, and other ground stationary sources that contribute to the community noise environment. Beyond statutory requirements, local jurisdictions are free to adopt their own goals and policies in their noise elements, although most jurisdictions have chosen to adopt noise/land use compatibility guidelines that are similar to those recommended by the state. The overlapping L_{dn} ranges indicate that local conditions (existing noise levels and community attitudes toward dominant noise sources) should be considered in evaluating land use compatibility at specific locations.

In addition to regulating noise through noise element policies, local jurisdictions regulate noise through enforcement of local ordinance standards. These standards generally relate to noisy activities (e.g., use of loudspeakers and construction) and stationary noise sources and facilities (e.g., air conditioning units and industrial activities). Two cities within the SCAQMD, Los Angeles and Long Beach, operate port facilities. Noise from the Ports of Los Angeles and Long Beach are regulated by the noise ordinances and noise elements of the Los Angeles and Long Beach General Plans.

In terms of airport noise, some of the actions that airport proprietors have been allowed to take to address local community noise concerns include runway use and flight routing changes, aircraft operational procedure changes, and engine run-up restrictions. These actions generally are subject to approval by the FAA, which has the authority and responsibility to control aircraft noise sources, implement and enforce flight operational procedures, and manage the air traffic control system.

3.6.3 ENVIRONMENTAL SETTING

3.6.3.1 Noise Descriptors

Environmental noise levels typically fluctuate across time of day; different types of noise descriptors are used to account for this variability, and different types of descriptors have been developed to differentiate between cumulative noise over a given period and single noise events. Cumulative noise descriptors include the L_{eq}, L_{dn}, and CNEL. The L_{eq} is the actual time-averaged, equivalent steady-state sound level, which, in a stated period, contains the same acoustic energy as the time-varying sound level during the same period. L_{dn} and CNEL values result from the averaging of L_{eq} values (based on dBAs) over a 24-hour period, with weighting factors applied to different periods of the day and night to account for their perceived relative annoyance. For L_{dn}, noise that occurs during the nighttime period (10:00 p.m. to 7:00 a.m.) is “penalized” by 10 dB. CNEL is similar to L_{dn}, except that it also includes a “penalty” of approximately five dB for noise that occurs during the evening period (7:00 p.m. to 10:00 p.m.). Cumulative noise descriptors, L_{dn} and CNEL, are well correlated with public annoyance due to transportation noise sources. Table 3.6-2 shows the compatibility between various land uses and CNEL.

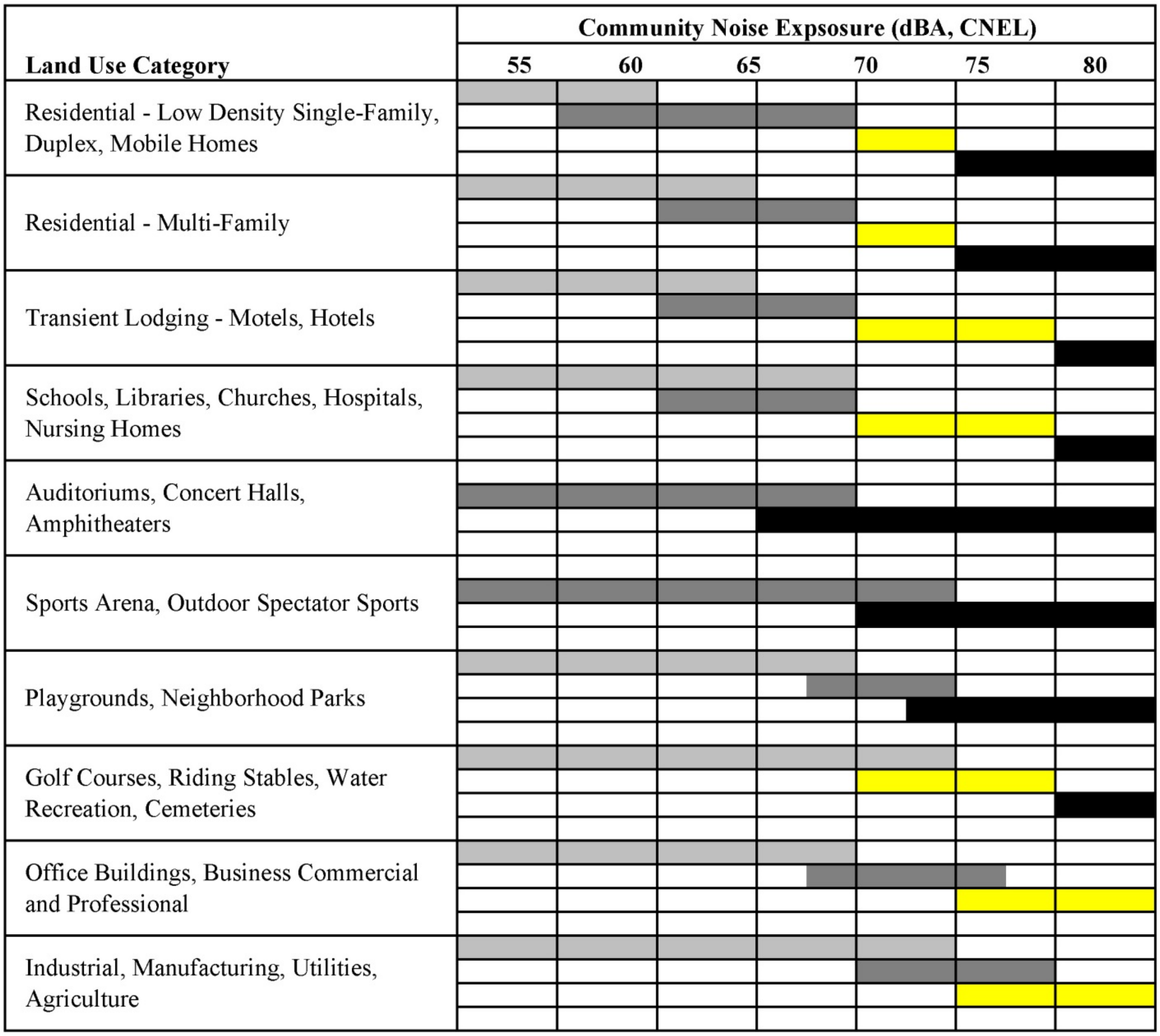
Individual noise events, such as train pass-bys or aircraft overflights, are further described using single-event and cumulative noise descriptors. For single events, L_{max} is often cited, as is the SEL. The SEL is the energy-based sum of a noise event of given duration that has been “squeezed” into a reference duration of one second and is typically a value that is five to 10 dB higher than the L_{max}.

3.6.3.2 Ambient Noise Levels

The approximately 11,000-square-miles in the SCAQMD include all or portions of 4 counties and 196 cities. It covers a diverse array of land uses that range from quiet, undeveloped rural areas to loud, dense, urban areas. Ambient noise levels for areas where sensitive receptors may be located can range from 46 dBA for a small town or quiet suburban area to greater than 87 dBA for an urban area next to a freeway. Given the size of the SCAQMD and the variation in sources, it is not feasible to complete a detailed noise monitoring study for this PEIR. Rather, this PEIR presents a discussion of noise levels associated with different noise sources, thereby allowing the reader to infer the noise level at different locations depending on the proximity of a location to a noise source. Ambient noise levels for a variety of land uses and locations as developed by SCAG are used to represent the range of ambient noise conditions by land use types (see Table 3.6-3).

TABLE 3.6-2

Noise Land Use Compatibility Matrix



Normally Acceptable - Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

Conditionally Acceptable - New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply system or air condionally will normally suffice.

Normally Unacceptable - New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and deeded noise insulation features including in the design.

Clearly Unacceptable - New construction or development should generally not be undertaken.

Source: Office of Planning and Research, 2003.

TABLE 3.6-3

Representative Ambient Noise Sampling Data

LOCATION	LAND USE	PEAK HOUR NOISE LEVEL (dBA, Leq)
City of Los Angeles	Recreation (Elysian Reservoir)	42
City of Los Angeles	Residential Area	51
City of Los Angeles	Industrial Area (Port)	67
City of Redlands	Freeway	65
City of Santa Monica	Residential Area	50
City of West Covina	Commercial Area	60

Source: SCAG, 2016

3.6.3.2 Vibration Measuring and Reporting

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. The FTA Assessment states that background vibration velocity levels in residential areas is usually 50 VdB or lower, well below the threshold of perception for humans which is around 65 VdB. The upper range for rapid transit vibration is around 80 VdB and the high range for commuter rail vibration is 85 VdB (U.S. FTA, 2006).

The FTA Assessment states that in contrast to airborne noise, ground-borne vibration is not a common environmental problem. Although the motion of the ground may be noticeable to people outside structures, without the effects associated with the shaking of a structure, the motion does not provoke the same adverse human reaction to people outside. Within structures, the effects of ground-borne vibration include noticeable movement of the building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. The maximum vibration amplitudes of the floors and walls of a building often will be at the resonance frequencies of various components of the building. However, the FTA Assessment states that noticeable vibration inside a building is typically caused by equipment or activities within the building itself, such as heating and ventilation systems, footsteps or doors closing.

The FTA Assessment states that it is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. However, some common sources of vibration are trains, buses on rough roads, and construction activities, such as blasting, pile driving, and heavy earth-moving equipment.

Vibration can be a serious concern, causing buildings to shake and rumbling sounds to be heard. Several different methods are used to quantify vibration. High levels of vibration may cause physical personal injury or damage to buildings. However, ground-borne vibration levels rarely affect human health. Instead, most people consider ground-borne vibration to be an annoyance that may affect concentration or disturb sleep. In addition, high levels of ground-borne vibration may damage fragile buildings or interfere with equipment that is highly sensitive to ground-borne vibration (e.g., electron microscopes).

3.6.3.3 Sensitive Receptors

Some land uses are considered more sensitive to ambient noise levels than others due to the amount of noise exposure (in terms of both exposure time and "insulation" from noise) and the types of activities typically involved. Residences, motels and hotels, schools, libraries, churches, hospitals, nursing homes, auditoriums, natural areas, parks and outdoor recreation areas are generally more sensitive to noise than are commercial and industrial land uses. Consequently, the noise standards for sensitive land uses are more stringent than those for less sensitive uses, such as commercial and industrial.

To protect various human activities and sensitive land uses (e.g., residences, schools, and hospitals) lower noise levels are needed. A noise level of 55 to 60 dB L_{dn} outdoors is the upper limit for intelligible speech communication inside a typical home. In addition, social surveys and case studies have shown that complaints and community annoyance in residential areas begin to occur at 55 dB L_{dn}. Sporadic complaints associated with the 55 to 60 dB L_{dn} range give way to widespread complaints and individual threats of legal action within the 60 to 70 dB L_{dn} range. Noise levels at 70 dB L_{dn} and above are unacceptable in residential communities (SCAG, 2016).

3.6.3.4 Noise Sources

Many principal noise generators within the SCAQMD are associated with transportation (e.g., airports, freeways, arterial roadways, seaports, and railroads). Additional noise generators include stationary sources, such as industrial manufacturing plants and construction sites. Local collector streets are not considered to be a significant source of noise since traffic volume and speed are generally much lower than for freeways and arterial roadways. Generally, transportation-related noise sources characterize the ambient noise environment of an area.

3.6.3.4.1 Airports

Southern California contains six established airports, including Los Angeles International (LAX), Bob Hope (formerly Burbank), John Wayne, Long Beach, Ontario, and Palm Springs. There are also four new and emerging airports in the Inland Empire and North Los Angeles County. These include San Bernardino International Airport (formerly Norton Air Force Base), March Inland Port (joint use with March Air Reserve Base), Southern California Logistics Airport (formerly George Air Force Base), and Palmdale Airport (joint use with Air Force Plant 42).

Airport noise is generated primarily by aircraft takeoffs and landings, which will vary depending on the aircraft's weight and the number, type, and location of the engines. Typically, most major public airports will have an airport land use plan that provides guidance on noise levels and land use in adjacent areas. The FAA measures airport-related noise in communities in terms of overall exposure rather than single events such as takeoffs and landings since overall exposure would account for the overall number of noise events and the time when these events occur. The day night average sound level (L_{dn}) is the standard federal (FAA and U.S. EPA) metric for this measurement; however, the FAA also accepts the CNEL when a state requires that metric to assess noise effects. The State of California Department of Transportation Division of Aeronautics adopted the CNEL as their methodology for describing airport noise exposure. Noise levels computed by these two methods typically differ by less than 1 dBA. The resulting noise contour map identifies geographic areas that are exposed to various levels of impacts from airport noise. Areas that are within the noise contours of 65 dBA CNEL and above, associated with airport activities, are considered to be incompatible with certain land uses, including residences, schools, hospitals, and childcare facilities (SCAG, 2016).

3.6.3.4.2 Freeways and Arterial Roadways

The SCAG regional has over 12,000 miles of freeway, including 938 miles of High Occupancy Vehicle (HOV) lanes. In addition, the local street system provides for access to local businesses and residents and accounts for over 80 percent of the total road network, with over 16,000 miles of principal arterials and almost 20,000 miles of minor arterials (SCAG, 2016). Additionally, the SCAG region has a growing network of tolled lanes and High-Occupancy Toll (HOT) lanes. Regionally significant arterials provide access to the freeway system and often serve as parallel alternate routes; in some cases, they are the only major system of transportation available to travelers. Traffic noise is generated primarily from vehicles and dominated by trucks. In general, higher traffic volumes, higher speeds, and greater numbers of trucks will increase the noise level. Vehicle noise comes from noises generated by the engine, exhaust, and tires, and is often exacerbated by vehicles in a state of disrepair, such as defective mufflers or struts (SCAG, 2016).

The extent to which traffic noise levels affect sensitive land uses depends upon a number of factors. These include whether the roadway itself is elevated above grade or depressed below grade, whether there are intervening structures or terrain between the roadway and the sensitive uses, and the distance between the roadway and such uses. For example, measurements show that depressing a freeway by approximately 12 feet yields a reduction in traffic noise relative to an at-grade freeway of seven to 10 dB at all distances from the freeway. Traffic noise from an elevated freeway is typically two to 10 dB less than the noise from an equivalent at-grade facility within 300 feet of the freeway, but beyond 300 feet, the noise radiated by an elevated and at-grade freeway (assuming equal traffic volumes, fleet mix, and vehicle speed) is the same (SCAG, 2016).

Additionally, southern California has an enormous number of arterial roadways. Typical arterial roadways have one or two lanes of traffic in each direction, with some containing as many as four lanes in each direction. Noise from these sources can be a significant environmental concern where buffers (e.g., buildings, landscaping, etc.) are inadequate or where the distance from centerline to sensitive uses is relatively small. Given typical daily traffic volumes of 10,000 to 40,000 vehicle trips, noise levels along arterial roadways typically range from 65 to 70 dB L_{dn} at a distance of 50 feet from the roadway centerlines.

3.6.3.4.3 Railroad Operations

Railroad operations generate high, relatively brief, intermittent noise events. These noise events are an environmental concern for sensitive uses located along rail lines and in the vicinities of switching yards. Locomotive engines and the interaction of steel wheels and rails primarily generate rail noise. The latter source creates three types of noise: 1) rolling noise due to continuous rolling contact, 2) impact noise when a wheel encounters a rail joint, turnout or crossover, and 3) squeal generated by friction on tight curves. For very high speed rail vehicles, air turbulence can be a significant source of noise as well. In addition, use of air horns and crossing bell gates contribute to noise levels in the vicinity of grade crossings (U.S. FTA, 2006).

3.6.3.4.4 Freight Trains

Noise levels generated by freight train pass-by events reflect locomotive engine noise and rail car wheel rail interaction. The former depends upon track grade conditions (e.g., uphill versus downhill) and is largely independent of speed, whereas the latter is highly speed dependent, increasing approximately six dB for each doubling of train velocity (SCAG, 2016). In addition to noise, freight trains also generate substantial amounts of ground-borne noise and vibration in the vicinity of the tracks. Ground-borne noise and vibration is a function of both the quality of the track and the operating speed of the vehicles.

Southern California has an extensive network of railroad lines belonging primarily to two major railroads: Union Pacific Railroad (Union Pacific) and Burlington Northern Santa Fe Railway (BNSF). SCAG's Inland Empire Railroad Main Line Study suggest that the number of freight trains on most BNSF and UP lines will more than double between 2000 and 2025 in response to a tripling of container volume at the San Pedro Bay Ports. A rail line supporting 40 freight trains per day generates approximately 75 dB L_{dn} at 200 feet from the tracks. BNSF rail lines extend south from switching yards in eastern Los Angeles to the Los Angeles and Long Beach ports complex and east to Arizona and points beyond via San Bernardino County. BNSF generates approximately 75 dB L_{dn} at a distance of 200 feet from the tracks (SCAG, 2016).

3.6.3.4.5 Commuter and Inter-City Passenger Trains

In general, the noise generated by commuter rail facilities (powered by either diesel or electric locomotives) is from the locomotives themselves. In the SCAQMD, there are two commuter and inter-city passenger train operators: AMTRAK and the Southern California Regional Rail Authority/Metrolink. AMTRAK operates trains with destinations in Seattle, Chicago, Orlando, San Diego, and San Luis Obispo. A typical AMTRAK pass-by event generates 107 dB SEL at 50 feet; two such events during the daytime or evening periods generate approximately 61 dB L_{dn} at 50 feet and approximately 52 dB L_{dn} at 200 feet. Nine such events generate approximately 67 dB L_{dn} at 50 feet and 58 dB L_{dn} at 200 feet (SCAG, 2016).

The Southern California Regional Rail Authority operates the Metrolink commuter rail system. This system currently includes 57 rail stations and seven rail lines, with destinations in Ventura, Los Angeles, San Bernardino, Riverside, Orange, and San Diego Counties. Noise levels generated by Metrolink are similar to those associated with AMTRAK (SCAG, 2016).

3.6.3.4.6 Steel Wheel Urban Rail Transit

Heavy rail is generally defined as electrified rapid transit trains with dedicated guideway, and light rail as electrified transit trains that do not require dedicated guideway. In general, noise increases with speed and train length. Sensitivity to rail noise generally arises when there is less than 50 feet between the rail and sensitive receptors. A significant percentage of complaints about noise can be attributed to the proximity of switches, rough or corrugated track, or wheel flats (SCAG, 2016).

Within the SCAQMD, the Los Angeles County Metropolitan Transit Authority (Metro) provides urban rail transit service on two subway lines (Purple and Red) and four light-rail lines (Blue, Expo, Gold, and Green). The Purple Line extends from downtown Los Angeles west to the Koreatown neighborhood with eight existing stations. The Red Line extends from Downtown Los Angeles west to the Koreatown neighborhood and then north to North Hollywood with 14 stations. The Blue Line extends from Long Beach to Downtown Los Angeles with 22 stations. The Expo Line extends from Downtown Los Angeles to Culver City with 21 existing stations. The Gold Line connects Union Station with Pasadena. The Green Line extends from Norwalk west to El Segundo and south to Redondo Beach with 14 existing stations.

Other Metro operated urban transit systems include the two bus rapid transit ways (Orange and Silver). The Orange Line extends from North Hollywood, through Woodland Hills to Chatsworth with 18 existing stations. The Silver Line extends from El Monte to Downtown Los Angeles then south to Gardena with 10 existing stations.

3.6.3.4.7 Port Operations

The Ports of Long Beach and Los Angeles are major regional economic development centers and provide a major link between the United States and the Pacific Rim countries. These ports currently handle approximately 40 percent of the volume imported into the country. Noise at the ports is generated from three sources: ships using the port facilities, equipment associated with cargo activity within the port, and truck and rail traffic moving cargo to and from the ports. All sources affect the ambient noise levels in the port areas. Residential areas in San Pedro (City of Los Angeles) and West Long Beach are affected most by truck and rail traffic related to the Ports (SCAG, 2016).

The Alameda Corridor provides a substantial long-term reduction in noise and vibration associated with rail operations in the vicinities of the Ports of Long Beach and Los Angeles. The Alameda Corridor consolidates the operations of Union Pacific and BNSF on 90 miles of existing branch line tracks into one 20-mile corridor along Alameda Street. This corridor provides a direct connection between the Ports of Long Beach and Los Angeles and the Union Pacific and BSNF switching yards in eastern Los Angeles. The Alameda Corridor includes four overpasses and three underpasses at intersections south of State Route 91 (SR-91) that allow vehicles to pass above the trains. North of SR-91, trains pass through a 10-mile, 33-foot-deep trench. The construction of tracks in a below-grade trench, track construction on new base materials, and the use of continuous-welded track reduce noise impacts on adjacent uses from freight trains associated with the ports. Also, the Alameda Corridor includes sound walls in certain locations to mitigate vehicle noise along Alameda Street in residential neighborhoods and other sensitive areas.

3.6.3.4.8 Industrial, Manufacturing, and Construction

Noise from industrial complexes, manufacturing plants, and construction sites are characterized as stationary, or point, sources of noise even though they may include mobile sources, such as forklifts and graders. Local governments typically regulate noise from industrial, manufacturing, and construction equipment and activities through enforcement of noise ordinance standards, implementation of general plan policies, and imposition of conditions of approval for building or grading permits (SCAG, 2016).

Industrial complexes and manufacturing plants are generally located away from sensitive land uses, and, as such, noise generated from these sources generally has less effect on the local community. In contrast to industrial and manufacturing plants, construction sites are located throughout the region and are often located within, or adjacent to, residential districts. In general, construction activities generate high noise levels intermittently on and adjacent to the construction sites, and the related noise impacts are short-term in nature. The dominant source of noise from most construction equipment is the engine, usually a diesel engine, with inadequate muffling. However, in a few cases, such as impact pile driving or pavement breaking, noise generated that activity dominates. Construction equipment can be considered to operate in two modes, stationary and mobile. Stationary equipment operates in one location for one or more days at a time, with either a fixed-power operation (pumps, generators, compressors) or a variable noise operation (pile drivers, pavement breakers). Mobile equipment moves around the construction site with power applied in cyclic fashion (bulldozers, loaders), or movement to and from the site (trucks) (SCAG, 2016).

Construction-related noise levels generally fluctuate depending on the construction phase, equipment type and duration of use, distance between noise source and receptor, and presence or absence of barriers between noise source and receptor. The FTA has established typical noise levels associated with various types of construction-related equipment (see Table 3.6-4). The Standard convention is that noise levels decrease by approximately six dB with each doubling of distance from the construction site (e.g., noise levels from excavation might be approximately 83 dB at 100 feet from the site, and so the noise level at 200 feet from the site would be about 77 dB). Interior noise levels from construction are approximately ten dB (open windows) to 20 dB (closed windows) less than exterior noise levels due to the attenuation provided by building facades (SCAG, 2016).

3.6.3.5 Existing Vibration Sources

Similar to the environmental setting for noise, the vibration environment is typically dominated by traffic from nearby roadways and activity on construction sites. Heavy trucks can generate groundborne vibrations that vary depending on vehicle type, weight, and road/pavement conditions. Heavy trucks typically operate on major streets. Nonetheless, vibration levels adjacent to roadways are typically not perceptible.

TABLE 3.6-4

Construction Equipment Noise Levels

Equipment	Typical Noise Level 50 ft from Source (dBA)
Air Compressor	81
Backhoe	80
Ballast Equalizer	82
Ballast Tamper	83
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Concrete Vibrator	76
Crane, Derrick	88
Crane, Mobile	83
Dozer	85
Generator	81
Grader	85
Impact Wrench	85
Jack Hammer	88
Loader	85
Paver	89
Pile-driver (Impact)	101
Pile-driver (Sonic)	96
Pneumatic Tool	85
Pump	76
Rail Saw	90
Rock Drill	98
Roller	74
Saw	76
Scarifier	83
Scraper	89
Shovel	82
Spike Driver	77
Tie Cutter	84
Tie Handler	80
Tie Inserter	85
Truck	88

Source: U.S. FTA, 2006.

3.7 SOLID AND HAZARDOUS WASTE

The purpose of the 2016 AQMP is to address the federal 2008 8-hour ozone standard, the 2012 annual PM2.5 standard, and the 2006 24-hour PM2.5 standard, to satisfy the planning requirements of the federal CAA, and to provide an update on the strategy to meet the 1997 8-hour ozone NAAQS and 1979 1-hour ozone NAAQS. Some of the proposed control measures intended to improve overall air quality may have direct or indirect impacts on solid and hazardous waste associated with their implementation, and in particular, the discarding of old equipment and vehicles. This subsection describes the existing setting related to solid and hazardous waste within California and the South Coast Air Basin.

3.7.1 REGULATORY BACKGROUND

The Regulatory Background is divided into two sections: Solid Waste and Hazardous Waste.

3.7.1.1 Solid Waste

3.7.1.1.1 Federal

The U.S. EPA is the primary federal agency charged with protecting human health from pollution and with safeguarding the natural environment: air, water, and land. The U.S. EPA works to develop and enforce regulations that implement environmental laws enacted by Congress. The U.S. EPA is also responsible for researching and setting national standards for a variety of environmental programs, and delegates to states and tribes the responsibility for issuing permits and for monitoring and enforcing compliance. Since 1970, Congress has enacted numerous environmental laws including the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and the Toxic Substances Control Act (TSCA). 40 CFR, Part 258 Subtitle D of the RCRA establishes minimum location standards for siting municipal solid waste landfills. Because California laws and regulations governing the approval of solid waste landfills meet the requirements of Subtitle D, the U.S. EPA delegated the enforcement responsibility to the State of California.

3.7.1.1.2 State

California Integrated Waste Management Act (AB 939): With regard to solid non-hazardous wastes, the California Integrated Waste Management Act of 1989 (AB 939), as amended, requires every city and county in the state to prepare a Source Reduction and Recycling Element (SRRE) with its Solid Waste Management Plan that identifies how each jurisdiction will meet the mandatory state waste diversion goals of 25 percent by the year 1995, and 50 percent by the year 2000. Senate Bill 2202 (SB 2202) mandates that jurisdictions continue 50 percent diversion on and after January 1, 2000. The purpose of AB 939 is to facilitate the reduction, recycling, and re-use of solid waste to the greatest extent possible. AB 939 has recognized that landfills and transformation facilities are necessary components of any integrated solid waste management system and an essential component of the waste management hierarchy. AB 939 establishes a hierarchy of waste management practices in the following order and priority: (1) source reduction; (2) recycling and composting; and (3) environmentally safe transformation/land disposal.

CalRecycle (formerly known as the California Integrated Waste Management Board) has numerous responsibilities in implementing the federal and state regulations summarized above. CalRecycle is the state agency responsible for permitting, enforcing and monitoring solid waste landfills, transfer stations, material recovery facilities (MRFs), and composting facilities within California. Permitted facilities are issued Solid Waste Facility Permits (SWFPs) by CalRecycle. CalRecycle also certifies and appoints Local Enforcement Agencies (LEAs), county or city agencies which monitor and enforce compliance with the provisions of SWFPs. CalRecycle is also responsible for monitoring implementation of AB 939 by the cities and counties. In addition to these responsibilities, CalRecycle also manages the Recycled-Content Materials Marketing Program to encourage the use of specific recycled-content products in road applications, public works projects and landscaping. These products include recycled aggregate, tire-derived aggregate, rubberized asphalt concrete, and organic materials.

AB 939 requires that each county in the State of California prepare a Countywide Integrated Waste Management Plan (CIWMP). The CIWMP is a countywide planning document that describes the programs to be implemented in unincorporated and incorporated areas of the county that will effectively manage solid waste, and promote and implement the hierarchy of CalRecycle. CIWMPs consist of an Integrated Waste Management Summary Plan (Summary Plan), an SRRE, a Household Hazardous Waste Element, a Non-Disposal Facility Element, and a Countywide Siting Element.

California Solid Waste Reuse and Recycling Act (CSWRRA, AB 2176): In 1991, the California Solid Waste Reuse and Recycling Act (CSWRRA) was enacted to assist local jurisdictions in accomplishing the goals set forth in AB 939. AB 2176 requires that any development projects that have submitted an application for a building permit must also include adequate and accessible areas for the collection and loading of recyclable materials.

Solid Waste Diversion Rule (AB 341): In 2011, AB 341 directed CalRecycle to develop and adopt regulations to mandate commercial recycling. In 2012, the final regulation was approved and a policy goal declared that not less than 75 percent of solid waste generated be source reduced, recycled, or composted by the year 2020.

Prohibition on Local Disposal Limits (AB 845): AB 845 was signed by Governor Brown on September 25, 2012 and prohibits an ordinance enacted by a city or county from otherwise restricting or limiting the importation of solid waste into a privately owned solid waste facility in that city or county based on place of origin.

Engineered Municipal Solid Waste (AB 1126): AB 1126 was signed on September 28, 2013 and defines the terms "engineered municipal solid waste (EMSW) conversion" and "EMSW facility." AB 1126 stipulates that solid waste processed through an EMSW conversion facility would be considered disposal and the energy generated by such a facility would not be considered renewable.

Reducing GHG Emissions in California (AB 32): As part of the California Global Warming Solutions Act of 2006, CARB was directed to adopt a scoping plan by 2009 which lays out initial measures needed to meet the 2020 target of reducing GHG emissions back to 1990 levels. The First Update to the Climate Change Scoping Plan was approved in 2014 stated that CARB and CalRecycle will work to eliminate landfill disposal of organic materials, a major source of GHG (methane).

Organic State Laws (AB 1594 and 1826): On September 28, 2014, Governor Brown signed two bills into law that are intended to substantially reduce the amount of organic waste that is disposed in California landfills. AB 194 states that for the purposes of complying with the waste diversion mandates of AB 939, beginning January 1, 2020, the use of green waste will be considered disposal and not recycling. A jurisdiction must include information on how it intends to address compliance with the waste diversion mandates of AB 939, beginning August 1, 2018. Jurisdictions which are not able to comply with AB 939 will be required to identify and address barriers to recycling green material, if sufficient capacity at organic waste recycling facilities is not available. AB 1826 requires jurisdictions to implement an organic waste recycling program for businesses that would include outreach, education, and monitoring of affected businesses by January 1, 2016.

Conversion Technology (SB 498): Governor Brown signed into law SB 498 on September 28, 2014, which requires 50 percent diversion of solid waste, of which 10 percent can come from transformation or biomass conversion. State law formerly limited biomass conversion to only the controlled combustion of organic materials, such as wood, lawn and garden clippings, agricultural waste, leaves, tree pruning, and non-recyclable producing electricity or heat. SB 498 expanded the definition of biomass conversion to include non-combustion thermal conversion technologies. In doing so, SB 498 allows for cleaner and more efficient non-combustion conversion technologies to be used to convert biomass into fuels and products in addition to heat and/or electricity.

3.7.1.1.3 Local

A Summary Plan is a solid waste planning document required by Public Resources Code § 41751, in which counties or regional agencies provide an overview of significant waste management problems faced by the jurisdiction, along with specific steps to be taken, independently and in concert with cities within their boundaries, to achieve the 50 percent waste diversion mandate (LADPW, 2015).

Each county is required to prepare and administer a CIWMP. The plan is comprised of the county's and cities' solid waste reduction planning documents, a Summary Plan, and a Countywide Siting Element. The CIWMP consists of the following components: waste characterization, source reduction, recycling, composting, solid waste facility capacity, education and public information, funding, special waste, and integration. The CIWMP also provides an estimate of the total permitted disposal capacity needed for a 15-year period if counties determine that their existing disposal capacity will be exhausted within 15 years or if additional capacity is desired.

Each city and county is required to prepare, adopt, and submit to CalRecycle a Household Hazardous Waste Element which identifies a program for the safe collection, recycling, treatment, and disposal of hazardous wastes that are generated by households. The Household Hazardous

Waste Element specifies how household hazardous wastes generated within the jurisdiction must be collected, treated, and disposed. An adequate Household Hazardous Waste Element contains the following components: Evaluation of alternatives, program selection, funding, implementation schedule and education and public information.

Each city and county is required to prepare, adopt, and submit to CalRecycle a Non-Disposal Facility Element which includes a description of new facilities and expansion of existing facilities and all solid waste facility expansions (except disposal and transformation facilities) that recover for reuse at least five percent of the total volume.

Each county in the SCAG region has created a CIWMP in accordance with AB 939. Below is a brief description of the recent updates to these plans by county.

Los Angeles County

The latest update to the Los Angeles County CIWMP was in 2014. AB 939 requires each county to prepare a Countywide Siting Element that describes how the county and the cities within the county plan to manage the disposal of their solid waste for a 15-year planning period. The Los Angeles County revised its Countywide Siting Element to:

- Remove two potential landfill sites: Elsmere and Blind Canyon Landfills;
- Include the proposed expansion of two in-county Class III landfills (Chiquita Canyon and School Canyon Landfills) in order to increase landfill capacity within the county;
- Update the goals and policies to be more aligned with a new solid waste management paradigm, to enhance the comprehensiveness of the county's solid waste management system, and to incorporate current and upcoming solid waste management processes and technologies;
- Promote development of alternatives to landfilling, such as conversion technologies, on a countywide basis; and
- Promote development and use of infrastructure to transport solid waste to out-of-county landfills, such as Mesquite Regional Landfill.

Los Angeles County's 2014 Annual Report details the revision process, assesses remaining permitted capacity for the mandated 15-year planning horizon, outlines seven disposal capacity scenarios, capacity to meet future demand through the use of alternative technologies, and out-of-county disposal facilities. The 2014 Annual Report outlines county solid waste management challenges, including a projected shortfall of permitted disposal capacity in the county in the 15-year planning period. In order to maintain adequate disposal capacity, the county and cities within the county need to: (1) maximize waste reduction and recycling; (2) expand existing landfills; (3) study, promote, and develop alternative technologies; (4) expand transfer and processing infrastructure; and (5) use out-of-county disposal, including waste-by-rail (LACDPW, 2015).

Orange County

Orange County completed the first review of its CIWMP in April 2003. It found sufficient disposal capacity for the 15-year planning horizon, but identified other challenges, including the lack of an operational materials recovery facility in the southern portion of the county, changes in records management to comply with the Disposal Recovery System, and determination of accurate base year data. The 2007 Strategic Plan Update for this planning project summarizes progress to maximize capacity at existing landfills, assess alternative technologies and potential out-of-county disposal sites, and expand the Frank R. Bowerman and Olinda Alpha Landfills.

The Orange County Waste and Recycling Department prepared a 2015 Annual Report to evaluate the status of its waste management system. The report indicates that the three existing landfills, Olinda Alpha, Frank R. Bowerman, and Prima Deshecha, are expected to provide sufficient capacity to serve Orange County for at least 50 additional years (OC Waste & Recycling, 2015).

Riverside County

Riverside County's CIWMP was approved in 1996. Its 2010 Annual Report found the original plan remained applicable, so no comprehensive update was planned. The Non-Disposal Facility Element was updated in 2009 and includes plans for four possible solid waste material recovery and transfer facilities; two of which would include household hazardous waste disposal facilities. The Non-Disposal Facility Element also includes an additional proposed solid waste material recovery facility with capacity for household hazardous waste disposal and one composting facility. The 2013 Five-Year Review Report for the CIWMP concluded that the overall framework of the CIWMP is still applicable and the goals, objectives, policies, waste management infrastructure, funding sources, and responsible administrative organization units noted throughout the CIWMP are still accurately described and that a revision of the CIWMP is not warranted (Riverside County Waste Management Department, 2013).

San Bernardino County

San Bernardino County CIWMP Five-Year Review Report was completed in 2007. The report reflects updates to the county's goals and policies, changes to its disposal facilities, and assesses disposal capacity for the mandated 15-year planning horizon. Updated policies include programs to help jurisdictions reach diversion goals, such as additional recycling and composting programs and the development of regional material recovery facilities. The 2007 Five-Year Review Report found that based on the remaining permitted refuse capacity and projected refuse generation for disposal, the landfills within the county have approximately 26 years of capacity. San Bernardino County's 2012 CIWMP Annual Report determined that no revisions were necessary to the County's CIWMP.

Regional Water Quality Control Boards (RWQCB)

New or expanded landfills must submit Reports of Waste Discharge to RWQCBs prior to landfill operations. In conjunction with the CIWMB approval of SWFPs, RWQCBs issue Waste Discharge Orders which regulate the liner, leachate control and removal, and groundwater monitoring systems at Class III landfills.

South Coast Air Quality Management District (SCAQMD)

SCAQMD regulates emissions from landfills. Landfill owners/operators must obtain permits to construct and operate landfill flares, cogeneration facilities or other facilities used to handle landfill gas. Owner/operators also are subject to the provisions of SCAQMD Rule 1150.1 - Control of Gaseous Emissions from Municipal Solid Waste Landfills. This rule requires the submittal of a compliance plan for implementation of a landfill gas control system, periodic ambient monitoring of surface emissions, and the installation of probes to detect the lateral migration of landfill gas.

3.7.1.2 Hazardous Waste

3.7.1.2.1 Federal

Hazardous material, as defined in 40 CFR Part 261.20 and 22 CCR Article 9, is required to be disposed of in Class I landfills. California has enacted strict legislation for regulating Class I landfills. The California Health and Safety Code (H&S) requires Class I landfills to be equipped with liners, a leachate collection and removal system, and a groundwater monitoring system.

The Hazardous Materials Transportation Act (HMTA) is the federal legislation regulating the trucks that transport hazardous wastes. The primary regulatory authorities are the U.S. Department of Transportation (U.S. DOT), the Federal Highway Administration (FHWA), and the Federal Railroad Administration (FRA). The HMTA requires that carriers report accidental releases of hazardous materials to U.S. DOT at the earliest practicable moment (49 CFR Subchapter C, Part 171).

The Resource Conservation and Recovery Act (RCRA) gives the U.S. EPA the authority to control hazardous waste from "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste by "large-quantity generators" (1,000 kilograms/month or more). Under RCRA regulations, hazardous wastes must be tracked from the time of generation to the point of disposal. At a minimum, each generator of hazardous waste must register and obtain a hazardous waste activity identification number. If hazardous wastes are stored for more than 90 days or treated or disposed at a facility, any treatment, storage, or disposal unit must be permitted under RCRA. Additionally, all hazardous waste transporters are required to be permitted and must have an identification number. RCRA allows individual states to develop their own program for the regulation of hazardous waste as long as it is at least as stringent as RCRA. In California, the U.S. EPA has delegated RCRA enforcement to CalEPA.

3.7.1.2.2 State

Authority for the statewide administration and enforcement of RCRA rests with CalEPA's Department of Toxic Substances Control (DTSC). While the DTSC has primary state responsibility in regulating the generation, transfer, storage and disposal of hazardous materials, DTSC may further delegate enforcement authority to local jurisdictions. In addition, DTSC is responsible and/or provides oversight for contamination cleanup, and administers statewide hazardous waste reduction programs. DTSC operates programs to accomplish the following: (1) deal with the aftermath of improper hazardous waste management by overseeing site cleanups; (2) prevent releases of hazardous waste by ensuring that those who generate, handle, transport, store, and dispose of wastes do so properly; and (3) evaluate soil, water, and air samples taken at sites. DTSC conducts annual inspections of hazardous waste facilities. Other inspections can occur on an as-needed basis.

The California Department of Transportation (Caltrans) sets standards for trucks transporting hazardous wastes in California. The regulations are enforced by the California Highway Patrol (CHP). Trucks transporting hazardous wastes are required to maintain a hazardous waste manifest. The manifest is required to describe the contents of the material within the truck so that wastes can readily be identified in the event of a spill.

The storage of hazardous materials in underground storage tanks (UST) is regulated by CalEPA's State Water Resources Control Board (SWRCB), which has delegated authority to the RWQCBs and, typically at the local level, to the local fire department.

The Hazardous Waste Control Act (HWCA) created the state's Hazardous Waste Management Program, which is similar to, but more stringent than, the federal RCRA program. The act is implemented by regulations contained in Title 26 of the CCR, which describes the following required aspects for the proper management of hazardous waste: identification and classification; generation and transportation; design and permitting of recycling, treatment, storage, and disposal facilities; treatment standards; operation of facilities and staff training; and closure of facilities and liability requirements. These regulations list more than 800 materials that may be hazardous and establish criteria for identifying, packaging, and disposing of such waste. Under the HWCA and Title 26, the generator of hazardous waste must complete a manifest that accompanies the waste from generator, to transporter, to the ultimate disposal location. Copies of the manifest must be filed with DTSC.

The Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program) required the administrative consolidation of six hazardous materials and waste programs (Program Elements) under one agency, a Certified Unified Program Agency (CUPA). The Program Elements consolidated under the Unified Program are: Hazardous Waste Generator and On-site Hazardous Waste Treatment Programs (Tiered Permitting); the Aboveground Petroleum Storage Tank Spill Prevention Control and Countermeasure Plan (SPCC); the Hazardous Materials Release Response Plans and Inventory Program (Hazardous Materials ARP); the UST Program; and Uniform Fire Code Plans and Inventory Requirements. The Unified Program is intended to provide relief to businesses complying with the overlapping, and sometimes conflicting, requirements of formerly independently managed programs. The Unified Program is implemented at the local government level by CUPAs. Most CUPAs have been established as a function of a local environmental health or fire department. Some CUPAs have contractual agreements with another local agency, a participating agency, which implements one or more Program Elements in coordination with the CUPA.

The Hazardous Waste Source Reduction and Management Review Act of 1989 requires generators of 12,000 kilograms/year of typical/operational hazardous waste to conduct an evaluation of their waste streams every four years and to select and implement viable source reduction alternatives. This act does not apply to non-typical hazardous waste (such as asbestos and polychlorinated biphenyls).

3.7.1.2.3 Local

Fire departments and other agencies in the SCAQMD have a variety of local laws that regulate reporting, storage and handling of hazardous materials and wastes.

3.7.2 SOLID WASTE MANAGEMENT

Permit requirements, capacity, and surrounding land use are three of the dominant factors limiting the operations and life of landfills. Landfills are permitted by the local enforcement agencies with concurrence from CalRecycle. Local agencies establish the maximum amount of solid waste which can be received by a landfill each day and the operational life of a landfill. Landfills are operated by both public and private entities. Landfills in the SCAQMD are also subject to requirements of the SCAQMD as they pertain to gas collection systems, dust, and nuisance impacts.

Landfills throughout the region typically operate between five and seven days per week. Landfill operators weigh arriving and departing deliveries to determine the quantity of solid waste delivered. At landfills that do not have scales, the landfill operator estimates the quantity of solid waste delivered (e.g., using aerial photography). Landfill disposal fees are determined by local agencies based on the quantity and type of waste delivered.

Over the past 20 years, disposal tonnage has decreased significantly in the SCAG region as the emphasis on recycling to meet the requirements of AB 939 has served to divert tonnage from landfills and conserve landfill capacity. Table 3.7-1 shows data from CalRecycle regarding the number of tons disposed in 2014 (the most recent year for which information is available) for each county within the jurisdiction of the SCAQMD (CalRecycle, 2015).

The state had an estimated 4.4 pounds per person per day capita disposal rate in 2013, which results in a 2013 disposal rate of about 65 percent. With approximately 1.7 billion tons of landfill capacity remaining statewide as of January 2014, models project that under a high disposal/conservative approach method, landfills will last about 25 years. Using a low disposal rate, California landfills should last until 2080 or longer (LA County, 2015).

TABLE 3.7-1

Solid Waste Disposed in 2014 by County

County	Total Tonnage(1)
Los Angeles	4,641,671
Orange	4,436,932
Riverside	3,531,326
San Bernardino	1,628,675
Total	**14,238,604**

Source: 2014 Landfill Summary Tonnage Report, CalRecycle, 2015

1. Data presented is for county totals and is not limited to the portion of the county within SCAQMD jurisdiction

In viewing facilities on a county-by-county basis, it is important to note that landfills in one county may import waste generated elsewhere. Currently, Orange County offers capacity to out-of-county waste at a "tipping fee" low enough to attract waste from Los Angeles and San Bernardino Counties. In Riverside County, the El Sobrante Landfill is licensed to accept up to 10,000 tons of waste per day (tpd) from Riverside, Los Angeles, Orange, San Diego, and San Bernardino Counties (SCAG, 2016).

Since the enactment of AB 939 in 1989, local governments have implemented recycling programs on a widespread basis, making efforts to meet the 25 percent and 50 percent diversion mandates of AB 939. Statewide, the CWIMB reports that diversion increased from ten percent in 1989 to 42 percent in 2000 and to 48 percent in 2002. Recent legislation, AB 341, requires that 75 percent of the waste stream be recycled by 2020 and planning is under way to achieve that goal (SCAG, 2016).

A total of 32 Class III active landfills and two transformation facilities are located within the SCAQMD with a total capacity of 112,592 tpd and 3,240 tpd, respectively (see Tables 3.7-2 and 3.7-3). The status of landfills within each county in the SCAQMD is described in Tables 3.7-4 through 3.7-7.

TABLE 3.7-2

Number of Class III Landfills Located and Related Landfill Capacity

County(1)	Number of Landfills	Permitted Capacity (tpd)
Los Angeles	12	43,649
Orange	3	23,500
Riverside(1)	7	26,314
San Bernardino(1)	10	19,129
Total	**32**	**112,592**

Source: CalRecycle, 2015a *State of Disposal in California* and Solid Waste Information System (SWIS)

1. Data presented is for the entire county and not limited to the portion of the county within the SCAQMD jurisdiction.

TABLE 3.7-3

Waste Transformation Facilities within the SCAQMD and Related Capacity

Facility	County	Permitted Capacity (tpd)
Commerce Refuse-to-Energy Facility	Los Angeles	1,000
Southeast Resource Recovery Facility	Los Angeles	2,240
Total	**-**	**3,240**

Source: Los Angeles County 2015, *CIWMP 2013 Annual Report*

3.7.2.1 Los Angeles County

The Los Angeles Countywide Siting Element addresses landfill disposal. The purpose of the Countywide Siting Element is to provide a planning mechanism to address the solid waste disposal capacity needed by the 88 cities in Los Angeles County and the unincorporated communities for each year of the 15-year planning period through a combination of existing facilities, expansion of existing facilities, planned facilities, and other strategies.

In 2014, residents and businesses in the county disposed of 9.2 million tons of solid waste at Class III landfills and transformation facilities located in and out of the county (see Tables 3.7-4 and 3.7-5). The amount of inert waste disposed at permitted inert waste landfills totaled 315,884 tons (LACDPW, 2015a).

TABLE 3.7-4

Annual Disposal Tonnage for 2014 (County of Los Angeles)

Facility Type	Weight	Units
In-County Class III Landfills	4,610,340	tons per year
Transformation Facilities	562,685	tons per year
Exports to Out-of-County Landfills	3,699,963	tons per year
Subtotal MSW Disposed	**8,872,988**	tons per year
Permitted Inert Waste Landfills	315,884	tons per year
Grand Total Disposed	**9,188,872**	tons per year

Source: LA County, 2015a

TABLE 3.7-5

Average Daily Disposal Rate for 2014 (Based on Six Operating Days) (County of Los Angeles)

Facility Type	Weight	Units
In-County Class III Landfills	14,777	tons per day
Transformation Facilities	1,803	tons per day
Exports to Out-of-County Landfills	11,859	tons per day
Subtotal MSW Disposed	**28,439**	tons per day
Permitted Inert Waste Landfills	1,012	tons per day
Grand Total Disposed	**29,451**	tons per day

Source: LA County, 2015a

3.7.2.1.1 Waste Generation

Based on a total disposal of 8.76 million tons (excluding inert waste and imports of 116 tons) and the 60 percent diversion rate, the county generated approximately 21.89 million tons or an average of 70,170 tpd (LA County, 2015a). In addition to waste generated within the county, Class III landfills and transformation facilities in the County also received 115,752 tons, or 371 tpd, of waste from jurisdictions outside the county in 2014.

Table 3-7.6 summarizes the lifespan and daily disposal of individual Los Angeles County landfills.

TABLE 3.7-6

Los Angeles County Landfill Status[1]

Solid Waste Facilities	2014 Average Tons/Day	Permitted Tons/Day	Remaining Permitted Capacity (million tons)	Estimated Remaining Life (years)
Landfills:				
Antelope Valley	1433	1,800	14.94	27
Burbank	100	240	2.92	39
Calabasas	748	3,500	6.53	14
Chiquita Canyon	3,558	6,000	1.83	2
Lancaster	311	3,000	12.01	27
Pebbly Beach (Avalon)	11	49	0.05	15
Puente Hills	-	-	-	CLOSED
San Clemente Island	1	10	0.04	18
Scholl Canyon	745	3,400	3.82	16
Sunshine Canyon	7,582	12,100	64.69	23
Whittier (Savage Canyon)	286	350	5.26	41
Total	**14,775**	**30,449**	**112.09[2]**	**N/A**
Transformation Facilities:				
Commerce Refuse-to-Energy Facility	333	1,000	400	N/A
Southeast Resource Recovery Facility	1,470	2,240	1,370	N/A
Total	**1,711**	**3,240**	**1,770**	**N/A**
Permitted Inert Landfills				
Azusa	1,012	6,500	59.83	31

Source: LA County, 2015a.

Over the last decade, Los Angeles County has encouraged waste diversion and recycling activities at landfills located in the unincorporated county areas through the land use permit process. The permit process includes a Waste Plan Conformance Agreement, which requires a landfill operator to implement waste diversion and recycling programs as well as other activities, both on- and off-site to assist individual jurisdictions within the county in achieving the diversion mandate of AB 939. In addition, the agreement contains provisions to encourage and assist residents in properly disposing their waste. These active Class III landfills that have a Waste Plan Conformance Agreement with the county include Chiquita Canyon, Lancaster, and Sunshine Canyon City/County Landfills. Together, these landfills handle over 75 percent of in-county Class III waste.

Because of community resistance to the extension of operating permits for existing facilities and to the opening of new landfills in the county, and the dwindling capacity of those landfills with operating permit time left, the exact date on which landfill capacity within the county will be exceeded is uncertain. Landfill remaining life based on Solid Waste Facility Permits in the county ranges from three years at one facility, to as many as 42 years at another (L.A. County, 2015a).

Several landfills have recently been expanded or are proposing permit changes. The Solid Waste Facility Permit (SWFP) for the Azusa Reclamation Company Landfill received approval in November 2014 to accept 8,000 tpd of waste. The total proposed permitted boundary is approximately 302 acres with 266 acres designated for waste disposal (L.A. County, 2015a). The Whittier (Savage Canyon) Landfill's SWFP was recently revised in October 2013 to allow for the continued disposal of 350 tpd of non-hazardous refuse, acceptance of 3,000 tpd or non-hazardous inert debris or beneficial use, and an additional capacity of 4.39 million cubic yards (L.A. County, 2015a).

The Chiquita Canyon Landfill submitted an application in 2011 to request an expansion of disposal area from 257 acres to 400 acres and to increase the maximum elevation from 1,430 feet to 1,573 feet, as well as an increase the permitted daily disposal from 6,000 t to 12,000 tpd. The DEIR was circulated on July 10, 2014, but has yet to be approved (L.A. County, 2015a).

A DEIR was released for the Scholl Canyon Landfill on April 1, 2014 by the City of Glendale. The proposed expansion consists of two variations. A solely vertical expansion would add 5.5 million tons of additional disposal capacity, whereas a vertical and horizontal expansion that would provide an additional eight million tons of disposal capacity. Both variations retain the current permitted capacity of 3,400 tpd of non-hazardous solid waste. The Puente Hills Landfill closed as of October 31, 2013. Waste has been contractually diverted to other local transfer facilities and landfills (L.A. County, 2015a).

The Los Angeles County Department of Public Works (LACDPW) has reviewed the County's ability to meet daily disposal demands under different scenarios (e.g., landfill expansions, alternative technologies, waste-by-rail systems, and reduction/recycling). Under some of the scenarios, the county will have a difficult time meeting future disposal demands. In order to ensure disposal capacity to meet the county needs, jurisdictions in Los Angeles County must continue to pursue all of the following strategies: (1) expand existing landfills; (2) study, promote, and develop conversion technologies; (3) expand transfer and processing infrastructure; (4) develop a waste-by-rail system; and (5) maximize waste reduction and recycling.

3.7.2.2 Orange County

Orange County currently has three active Class III landfills. These landfills accepted more than 4 million tons of solid waste in 2014 and provides disposal services for 3.1 million residents in 34 cities and thousands of businesses. The three landfills include Prima Deshecha, Frank R. Bowerman and Olinda Alpha. The Prima Deshecha Landfill has a permitted capacity of 4,000 tpd and an expected closure date of 2067. The Frank R. Bowerman Landfill has a maximum capacity of 11,500 tpd, and an expected closure date of 2053. The Olinda Alpha Landfill has a permitted capacity of 8,000 tpd. The current permit expiration of the Olinda Alpha Landfill is 2021 (see Table 3.7-7).

TABLE 3.7-7

Orange County Landfill Status

Landfill	Total Tons Disposed 2014[1]	Permitted Tons/Day[2]	Remaining Permitted Capacity (million cubic yards) [2]	Estimated Year of Closure[2]
Frank R. Bowerman	1,977,367	11,500	205.00	2053
Olinda Alpha	2,075,885	8,000	36.59	2021
Prima Deshecha	386,724	4,000	87.38	2067
Total	**4,439,976**	**23,500**	**328.97**	**N/A**

1. CalRecycle 2015b Disposal Reporting System (DRS) California Solid Waste Statistics
2. CalRecycle, 2015c Solid Waste Information System (SWIS) Search

CalRecycle is responsible for ensuring that county waste is disposed of in a way that protects public health, safety and the environment. Long-range strategic planning is necessary to ensure that waste generated by the county is safely disposed of and that the county's future disposal needs are met. The Regional Landfill Options for Orange County (RELOOC) program was created for this reason. RELOOC is a 40-year strategic plan prepared by the Integrated Waste Management District (IWMD). The purpose of RELOOC is to evaluate options for solid waste disposal for Orange County citizens. The plan was last updated in September 2007 (RELOOC, 2007).

Orange County cities and unincorporated areas have completed, adopted and implemented a CIWMP. Orange County cities and unincorporated areas have residential curbside recycling programs in place. The three existing landfills are expected to provide sufficient capacity to serve Orange County for at least 50 additional years (OC Waste & Recycling, 2015).

3.7.2.3 Riverside County

Riverside County has six active sanitary landfills with a total permitted capacity of 26,314 tpd. Each of these landfills is located within the unincorporated area of the county and is classified as Class III. El Sobrante Landfill is a privately operated landfill open to the public. Assuming no expansion, the six major sites have closure dates projected from as early as 2021 to as late as 2098. The projected date of closure for each landfill is tentative and could be affected by engineering, environmental, and waste flow issues (see Table 3.7-8).

TABLE 3.7-8

Riverside County Landfill Status

Landfill	Total Tons Disposed 2014(1)	Permitted Tons/Day(2)	Remaining Permitted Capacity (million cubic yards) (2)	Estimated Year of Closure(2)
Badlands	838,052	4,000	14.73	2024
Blythe	17,802	400	4.16	2047
Desert Center	26	60	35.71	2087
El Sobrante	2,032,798	16,054	145.53	2045
Lamb Canyon	590,117	5,000	18.96	2021
Mecca	2	400	0.01	2098
Oasis	31,918	400	0.43	2055
Total	**3,510,715**	**26,314**	**219.53**	N/A

3. CalRecycle 2015b Disposal Reporting System (DRS) California Solid Waste Statistics
4. CalRecycle, 2015c Solid Waste Information System (SWIS) Search

3.7.2.4 San Bernardino County

The County of San Bernardino Solid Waste Management Division (SWMD) is responsible for the operation and management of the County of San Bernardino's solid waste disposal system and regional landfills.

San Bernardino County has seven public landfills within the SCAQMD's boundaries with a combined permitted capacity of 19,129 tpd. Mid-Valley/Fontana Landfill is estimated to reach final capacity by the end of 2033, San Timoteo by 2043, Victorville by 2047, Barstow by 2071, Landers by 2018, and California Street by 2042. The Colton Landfill was closed in 2014 (see Table 3.7-9).

TABLE 3.7-9

San Bernardino County Landfill Status

Landfill	Total Tons Disposed 2014[1]	Permitted Tons/Day[2]	Remaining Permitted Capacity (million cubic yards)[2]	Estimated Year of Closure[2]
Barstow	61,934	1,500	71.48	2071
California Street	64,146	829	6.80	2042
Colton	23,491	3,100	2.70	INACTIVE
Landers	41,390	1,200	0.77	2018
Mid-Valley	894,583	7,500	67.52	2033
San Timoteo	261,283	2,000	13.61	2043
Victorville	267,802	3,000	81.51	2047
Total	**1,614,629**	**19,129**	**244.39**	**N/A**

1. CalRecycle 2015b Disposal Reporting System (DRS) California Solid Waste Statistics
2. CalRecycle, 2015c Solid Waste Information System (SWIS) Search

3.7.3 HAZARDOUS WASTE MANAGEMENT

Hazardous material, as defined in 40 CFR 261.20 and 22 CCR Article 9, is disposed of in Class I landfills. California has enacted strict legislation for regulating Class I landfills. H&S requires Class I landfills to be equipped with liners, a leachate collection and removal system, and a groundwater monitoring system.

There are no hazardous waste disposal sites within the jurisdiction of the SCAQMD. Hazardous waste generated at area facilities, which is not reused on-site, or recycled off-site, is disposed of at a licensed in-state hazardous waste disposal facility. Two such facilities in California are the Chemical Waste Management Kettleman Hills (CWM Kettleman) facility in Kings County, and the Laidlaw Environmental Services (Buttonwillow) facility in Buttonwillow, Kern County.

CWM Kettleman hazardous waste facility was permitted to increase its capacity by about five million cubic yards in May of 2014 (DTSC News Release, 2014). CWM Kettleman has also applied to the U.S. EPA to both renew and modify its existing permits to allow for the expansion of the landfill. The expansion would provide another 12-14 years of life. CWM Kettleman is permitted to dispose of, or treat and store, hazardous waste from all over California. The facility accepts almost all solid, semi-solid, and liquid hazardous waste. However, CWM Kettleman is not permitted to accept biological agents or infectious wastes, regulated radioactive materials, or compressed gases and explosives.

Buttonwillow is a 320-acre facility operated by Clean Harbors Environmental Services and can accept in excess of 200 loads of waste per day. Typical waste streams include contaminated soils, hazardous waste for treatment of metals, plating waste, and hazardous and non-hazardous liquids. The permitted capacity at Buttonwillow is in excess of 10 million cubic yards (Clean Harbors, 2015). Buttonwillow is expected to continue receiving waste for an additional 70 years (Clean Harbors, 2015).

Hazardous waste also can be transported to permitted facilities outside of California. The nearest out-of-state landfills are U.S. Ecology, Inc., located in Beatty, Nevada; Laidlaw Environmental Services located in Lake Point, Utah; Envirosafe Services in Grandview, Idaho; Chemical Waste Management Inc. in Carlyss, Louisiana; and Waste Control Specialists in Andrews, Texas. U.S. Ecology, Inc. is in the process of extending its operational capacity for an additional 35 years. Incineration is provided at Laidlaw Environmental Services, Inc., located in Deer Park, Texas.

In 2013, about 2.49 million tons of hazardous waste was generated in the four counties that comprise the SCAQMD, and about 4.02 million tons of hazardous waste was generated in California (see Table 3.7-10). Those amounts have increased from the totals in 2011 by approximately 201 and 202 percent respectively. The most common types of hazardous waste generated in the SCAQMD include contaminated soils, waste oil and mixed oil, inorganic solid waste, organic solids, asbestos-containing waste, and unspecified oil-containing wastes. Because of the population and economic base in Southern California, a large portion of California's hazardous waste is generated within the SCAQMD. Not all wastes are disposed of in a hazardous waste facility or incinerator. Many of the wastes generated, including waste oil, are recycled within the Basin.

TABLE 3.7-10

Hazardous Waste Generation in the Basin – 2014
(By County) (tons per year)

Waste Name	Los Angeles	Orange	Riverside	San Bernardino	County Total (Basin)	Statewide Total
Contaminated Soils from Site Clean-Up	554,482	23,562	1,228	18,928	598,200	891,590
Blank / Unknown	44,958	343,816	330	2,342	391,447	577,174
Other Inorganic Solid Waste	250,893	54,948	1,325	11,226	318,393	476,716
Other Organic Solids	268,199	7,834	3,479	9,671	289,182	186,903
Waste Oil and Mixed Oil	220,827	16,549	6,618	38,857	282,851	526,315
Unspecified Oil-Containing Waste	47,804	4,713	1,765	18,781	73,063	116,426
Asbestos-Containing Waste	33,195	8,054	3,013	3,131	47,392	101,246
Baghouse Waste	38,074	58	1	1,793	39,926	75,269
Polychlorinated Biphenyls & Matls W/ PCBs	31,718	2,537	164	280	34,700	50,555
Off-Spec, Aged, or Surplus Organics	23,369	1,840	952	1,691	27,852	23,442
Aq Sol (2 < pH < 12.5) W Org Residues < 10%	16,570	3,888	616	4,633	25,707	48,323
Unspecified Organic Liquid Mixture	22,802	1,142	429	1,072	25,445	26,039
Unspecified Solvent Mixture	22,660	1,279	403	586	24,928	61,874
Unspecified Aqueous Solution (2 < pH < 12.5)	19,428	1,488	754	1,998	23,669	35,152
Aq Sol (2 < pH < 12.5) W Org Residues >= 10%	18,007	499	134	211	18,851	37,539
Oxygenated Solvents	14,065	584	118	329	15,096	20,137
Oil/Water Separation Sludge	9,788	739	356	455	11,338	18,438
Liquids W pH<=2	2,149	518	4,936	225	7,828	10,092
Off-Spec, Aged, or Surplus Inorganics	6,619	361	239	392	7,612	10,972
Household Wastes	3,619	2,259	235	588	6,701	13,179
Totals	**1,649,226**	**476,669**	**27,097**	**117,189**	**2,270,181**	**3,262,195**

Source: DTSC, 2015 Hazardous Waste Tracking System. Total Yearly Tonnage by Waste Code Report.
(1) Data presented is for county totals and is not limited to the portion of the county within AQMD jurisdiction.
(2) Waste names and totals are reported verbatim, rounded to the nearest ton.

3.8 TRANSPORTATION AND TRAFFIC

3.8.1 INTRODUCTION

The goal of the 2016 AQMP is to address the federal 2008 8-hour ozone standard, the 2012 annual PM2.5 standard, and the 2006 24-hour PM2.5 standard, to satisfy the planning requirements of the federal CAA, and to provide an update on the strategy to meet the 1997 8-hour ozone NAAQS and 1979 1-hour ozone NAAQS, thereby improving air quality and protecting public health. The 2016 AQMP also provides a preliminary evaluation of the 2015 federal 8-hour ozone standard (70 ppb). Some of the proposed control measures intended to improve overall air quality may have direct or indirect traffic impacts associated with their implementation. Traffic concerns are related to modifications to the existing transportation system that may generate significant impacts, primarily during the construction phases. This section describes the current transportation system in Southern California.

The Southern California transportation system is a complex intermodal network designed to carry both people and goods. It consists of roads and highways, public transit, paratransit, bus, rail, airports, seaports, and intermodal terminals. The regional highway system consists of an interconnected network of local streets, arterial streets, freeways, carpool lanes, and toll roads. This highway network allows for the operation of private autos, carpools, private and public buses, and trucks. Active transportation modes, such as bicycles and pedestrians, share many of these facilities. The regional public transit system includes local shuttles, municipal and area-wide public bus operations, rail transit operations, regional commuter rail services, and interregional passenger rail service. The freight railroad network includes an extensive system of rail lines serving industrial cargo and goods. The airport system consists of commercial, general, and military aviation facilities serving passenger, freight, business, recreational, and defense needs. The region's seaports support substantial international and interregional freight movement and tourist travel. Intermodal terminals consisting of freight processing facilities, which transfer, store, and distribute goods. The transportation system supports the region's economic needs, as well as the demand for personal travel.

3.8.2 TRANSPORTATION REGULATORY FRAMEWORK

3.8.2.1 Federal Regulatory Framework

In 2005, the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU; Public Law 109–59) was signed into law. SAFETEA-LU provides funding for highways, highway safety, and public transportation. The act followed two bills that highlighted surface transportation funding needs—the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and the Transportation Equity Act for the 21st Century (TEA-21). Signed into law in 1998, TEA-21 shaped the highway program to meet changing transportation needs throughout the nation. SAFETEA-LU addresses challenges such as improving safety, reducing traffic congestion, improving efficiency in freight movement, increasing intermodal connectivity, and protecting the environment. SAFETEA-LU also gives state and local transportation agencies more flexibility to solve transportation problems.

SAFETEA-LU expired in 2009 but Congress extended the legislation; the most recent extension is known as Moving Ahead for Progress in the 21st Century (MAP-21; Public Law 112-141). MAP-21, enacted in 2012, reauthorized most SAFETEA-LU highway, transit and safety programs.

The provisions of Title 23 USC Section 134 et seq. provide direct authority for Metropolitan Planning Organizations (MPOs), such as SCAG, to act as a regional transportation planning organization with direct responsibility for carrying out a regional transportation plan (RTP). SCAG is tasked with carrying out the transportation planning process and adopting long-range transportation plans for six counties, including the four within the SCAQMD jurisdiction. Collaborating with state and public transportation operators, SCAG undertakes a performance-driven, outcome-based approach to planning for the six county region. SCAG must prepare a transportation plan to be updated every four years, including identification of transportation facilities and factors for each mode of non-motorized transport to major roadways, transit, multimodal and intermodal facilities, and connectors that should function as an integrated system serving regional transportation functions.

3.8.2.1.1 MAP-21

MAP-21 replaced SAFETEA-LU as the nation's surface transportation program and extended the provisions for fiscal year 2012 with new provisions for 2013. MAP-21 funds surface transportation programs for 2013 and 2014 and provides additional funding by the passage of continuing resolutions. It is intended to create a streamlined, performance-based, and multimodal program to address challenges facing the United States transportation system. These challenges include improving safety, maintaining infrastructure condition, reducing traffic congestion, improving efficiency of the system and freight movement, protecting the environment, and reducing delays in project delivery. MAP-21 builds on and refines many of the highway, transit, bike, and pedestrian programs and policies first established under ISTEA in 1991. One of most significant changes from MAP-21 affecting MPOs, states, and transit operators is the new requirement for performance-based planning that involves use of performance measures and target setting. The U.S. Department of Transportation (U.S. DOT) is in the process of the rulemaking effort to implement these MAP-21 requirements.

3.8.2.1.2 Intelligent Transportation System (ITS)

ITSs are advanced applications aiming to provide innovative services relating to different modes of transport and traffic management and enable various users to be better informed and make safer, more coordinated, and smarter use of transport networks. With the passage of MAP-21, the ITS has fundamentally shifted from a program of research and development to one focused on infrastructure deployment. Traditionally, an ITS project is one that has information and communication technologies applied to the field of road transport, including infrastructure, vehicles, users, and in-traffic and mobility management, as well as interfaces with other modes of transport. One way to incorporate the MAP-21 vision and implement safety and security into transportation planning is through greater collaboration between transportation planning and operations. Collaboration is particularly critical in metropolitan regions and congested corridors where numerous jurisdictions, agencies, and service providers are responsible for the safety, security, and efficient operation of various aspects of the transportation system. Not only are roadway and transit system operators themselves dependent on the transportation system, but so are police, fire, and medical services, emergency response and domestic security systems, and port authorities. Because the successful operation of ITS projects usually depend on coordination and communication between different agencies and the systems they operate, it is essential that there be a region-wide framework for cooperation to help achieve that coordination and communication in the most cost-effective manner. In California, this framework is SCAG's Southern California Regional ITS Architecture, which strives to improve multimodal transportation system management and operation. Local components to the Southern California Regional ITS Architecture exist for Los Angeles, Orange, Ventura, and Imperial Counties, and the Inland Empire (Riverside and San Bernardino Counties).

3.8.2.1.3 Critical Needs Assessment under MAP-21: Statewide Transportation System Needs

There have also been several assessments of the critical state transportation infrastructure, which include identification of the key transportation facilities. In order for the SCAG region to be eligible to receive federal aid for transportation projects, it is required by federal law to prepare periodic assessments of its complex freeways, roads, bridges, rail systems, airports, public transit, and other transportation infrastructure. In 2011, the California Transportation Commission (CTC) commissioned a study that summarizes the state of transportation systems in the SCAG region and other Regional Transportation Planning areas from 2011 to 2020. This report includes the total cost of system preservation, system management, and system expansion projects during the ten-year study period.

3.8.2.1.4 Aviation and Transportation Security Act (ATSA) by the 107th Congress: The Mission of the Transportation Security Administration (TSA)

Following the September 11, 2001, terrorist attacks, the ATSA was created by the 107th Congress as Public Law 107–71. The ATSA created the TSA to oversee the security of the nation's transportation systems. With state, local, and regional partners, the TSA oversees security for highways, railroads, buses, mass transit systems, and ports. A vast majority of its resources are dedicated to aviation security, and it is primarily tasked with screening passengers and baggage.

3.8.2.1.5 Maritime Transportation Security Act of 2002

The Maritime Transportation Security Act of 2002 (Public Law 107–295), signed on November 25, 2002, is designed to protect the nation's ports and waterways from a terrorist attack. This law is the national equivalent to the International Ship and Port Facility Security Code (ISPS) and was fully implemented on July 1, 2004. It requires vessels and port facilities to conduct vulnerability assessments and develop security plans that may include passenger, vehicle, and baggage screening procedures; security patrols; establishing restricted areas; personnel identification procedures; access control measures; and/or installation of surveillance equipment.

3.8.2.1.6 The Disaster Mitigation Act of 2000 (DMA 2000)

DMA 2000 (Public Law 106–390) provides an opportunity for states, tribes, and local governments to take a new and revitalized approach to mitigation planning. DMA 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 by adding Section 322 – Mitigation Planning. Section 322 placed new emphasis on mitigation planning requiring governments to develop and submit mitigation plans as a condition of receiving any funding from the Hazard Mitigation Grant Program (HMGP) project grants. DMA 2000 reinforces the importance of pre-disaster infrastructure mitigation planning to reduce disaster losses nationwide and is aimed primarily at the control and streamlining of the administration of federal disaster relief and programs to promote mitigation activities.

3.8.2.2 State Regulatory Framework

3.8.2.2.1 Sustainable Communities and Climate Protection Act of 2008

The Sustainable Communities and Climate Protection Act of 2008 (Senate Bill [SB] 375, Chapter 728, Statutes of 2008) requires MPOs to prepare a sustainable communities strategy (SCS) that demonstrates how the region will meet its greenhouse gas (GHG) reduction targets through integrated land use, housing, and transportation planning. Specifically, the SCS must identify a transportation network that is integrated with the forecasted development pattern for the plan area and will reduce GHG emissions from automobiles and light duty trucks in accordance with targets set by CARB (California Govt. Code Section 65080(b)(2)(B)). Based on Executive Order (EO) G-12-039, the targets accepted by CARB for GHG quantification for SCAG are an eight percent reduction in per capita GHG emissions by 2020, and a 13 percent per capita reduction by 2035, in both cases with 2005 as a base year.

3.8.2.2.2 Changes to CEQA for Transit-Oriented Development

Senate Bill 743 (2013) codified the addition of Chapter 2.7, §21099 to the Public Resources Code (PRC) to provide for changes to CEQA for transit oriented development and establishes alternative metrics used for traffic levels of service (LOS) for transportation impacts inside transit priority areas. Key SB 743 language includes the following:

1. The Office of Planning and Research shall prepare, develop, and transmit to the Secretary of the Natural Resources Agency for certification and adoption proposed revisions to the guidelines adopted pursuant to §21083 establishing criteria for determining the significance of transportation impacts of projects within transit priority areas. Those criteria shall promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses. In developing the criteria, the office shall recommend potential metrics to measure transportation impacts that may include, but are not limited to, vehicle miles traveled, vehicle miles traveled per capita, automobile trip generation rates, or automobile trips generated. The office may also establish criteria for models used to analyze transportation impacts to ensure the models are accurate, reliable, and consistent with the intent of this section.

2. Upon certification of the guidelines by the Secretary of the Natural Resources Agency pursuant to this section, automobile delay, as described solely by level of service or similar measures of vehicular capacity or traffic congestion shall not be considered a significant impact on the environment pursuant to the division, except in locations specifically identified in the guidelines, if any.

Pursuant to PRC §21099(b)(1), the Office of Planning and Research (OPR) was required to prepare a draft revision to the CEQA Guidelines establishing new significance criteria within transit priority areas. Upon certification of those guidelines, LOS may no longer be used except if specifically identified in the guidelines (PRC § 21099(b)(2) and (c)(1)). On January 20, 2016, OPR released a revised proposal for changes to the CEQA Guidelines that will change the way transportation impacts are analyzed under CEQA. The guidelines propose to use vehicle-miles traveled (VMT) as the primary metric of transportation impacts across the state. The intent for using VMT as a criterion for measurement is to encourage good incremental, walkable, and transit-accessible projects.

3.8.2.2.3 California Transportation Plan (CTP)

The CTP (SB 64; Chapter 711 §14536 amended 65073.1) is prepared by the California Department of Transportation (Caltrans) every five years to provide a long-range policy framework to meet our future mobility needs and reduce GHG emissions. The CTP defines goals and performance-based policies, and strategies to achieve our collective vision for California's future statewide. The CTP is developed in collaboration with transportation stakeholders such as SCAG. Through ongoing engagement, the CTP is intended to provide goals and visions to support a fully integrated, multimodal, sustainable transportation system that improves mobility and supports quality of life criteria such as a prosperous economy, human and environmental health, and social equity. The CTP fulfills the state's goal to meet the Federal Transportation Improvement Program (FTIP).

3.8.2.2.4 Congestion Management Programs (CMP) Established in Accordance with Proposition 111

Proposition 111 (1990), or the Traffic Congestion Relief and Spending Limitation Act (Government Code 65088) enacted a statewide CMP and provides revenues to reduce traffic congestion by building state highways, local streets, and public mass transit facilities. The CMP was established to link land use, transportation, and air quality while prompting reasonable growth management programs that would effectively utilize existing transportation funds to alleviate traffic congestion (and its related impacts) and improve air quality. Under California law, CMPs are prepared and maintained by the Congestion Management Agencies (CMAs). The Los Angeles County Metropolitan Transportation Authority (Metro), Orange County Transportation Authority (OCTA), Riverside County Transportation Commission (RCTC), San Bernardino Associated Governments (SANBAG), and Ventura County Transportation Commission (VCTC) are the designated CMAs of each county and are subject to state requirements.

CMPs differs in form and local procedure because the magnitude of congestion and degree of urbanization differs amongst the counties.. Under state law, all CMPs are responsible for performing the monitoring and management functions shown below.

- *Highway Performance*. Each CMA monitors the performance of an identified highway system. This monitoring allows each county to track how their system, and its individual components, is performing against established standards, and how performance changes over time.

- *Multi-Modal Performance*. In addition to highway performance, each CMP contains an element to evaluate the performance of other transportation modes including transit.

- *Transportation Demand Management (TDM)*. Each CMP contains a TDM component geared at reducing alternative transportation methods.

- *Land Use Programs and Analysis.* Each CMP incorporates a program for analyzing the effects of local land use decisions on the regional transportation system.

- *Capital Improvement Program (CIP).* Using data and performance measures developed through the activities identified above, each CMP develops a CIP. This becomes the first step in developing the County Transportation Improvement Program (TIP). Under state law, projects funded through the Regional Transportation Improvement Program (RTIP) must first be contained in the county CIP.

- *Deficiency Planning*. The CMP contains provisions for "deficiency plans" to address unacceptable levels of congestion. Deficiency plans can be developed for specific problem areas or on a system-wide basis. Projects implemented through the deficiency plans must, by statute, have both mobility and air quality benefits. In many cases, the deficiency plans capture the benefits of transportation improvements that occur outside the county TIPs and RTIP such as non-traditional strategies and/or non-regionally significant projects.

The county CMPs, together with SCAG's 2016 Regional Transportation Plan/Sustainable Communities Strategy (2016 RTP/SCS) and FTIP, fulfill the federal requirements for a "congestion management" process in transportation management areas to provide for integrated management and operation of the multimodal transportation system through the use of travel demand reduction and operational management strategies. To ensure consistency, SCAG and the CMAs have developed the Regional Consistency and Compatibility Criteria for CMPs. Information on the CMP activities and resulting data is updated on a biennial basis by each CMA and supplied to SCAG and air quality management districts.

3.8.2.2.5 EO B-16-2012 on Zero Emission Vehicles

EO B-16-2-12 was signed on March 23, 2012, to encourage development of the ZEVs to protect the environment in the region. The goals that are promulgated include setting targets to meet goals in 2015, 2020, and 2025, supporting the commercialization of clean vehicles, and pursuing policies to promote private sector investment and made-in California technologies. EO B-16-2012 also sets a target for 2050 of a reduction of GHG emissions from the transportation sector equal equaling 80 percent less than 1990 levels.

In February 2013, an interagency working group developed the ZEV Action Plan which identifies specific strategies and actions that state agencies will take to meet the milestones of the EO B-16-2012. The ZEV Action Plan states:

> *ZEVs are crucial to achieving the state's 2050 greenhouse gas goal of 80 percent emission reductions below 1990 levels, as well as meeting federal air quality standards. Achieving 1.5 million ZEVs by 2025 is essential to advance the market and put the state on a path to meet these requirements.*

3.8.2.2.6 EO B-32-15 Integrated Action Plan to Improve California's Freight System

EO B-32-15 was issued on July 16, 2015, which orders the Secretary of the California State Transportation Agency, the Secretary of CalEPA, and the Secretary of the Natural Resources Agency to lead other relevant state departments including CARB, Caltrans, the California Energy Commission (CEC), and the Governor's Office of Business and Economic Development to develop an integrated action plan by July 2016 that establishes clear targets to improve freight efficiency, transition to zero-emission technologies, and increase competitiveness of California's freight system. The action plan shall identify state policies, programs, and investments to achieve these targets, and be informed by existing state agency strategies, including the California Freight Mobility Plan, Sustainable Freight Pathways to Zero and Near-Zero Emissions, Integrated Energy Policy Report, as well as broad stakeholder input.

3.8.2.2.7 Rail Operations

The California Public Utilities Commission (CPUC) has regulatory authority over rail operations and grade crossings throughout the state. No grade crossings would be added as part of the proposed project.

3.8.2.3 Regional Regulatory Framework

3.8.2.3.1 SCAG Active Transportation Strategies

The 2016 Active Transportation Plan included in the 2016 RTP/SCS proposes strategies to continue progress made in developing regional bikeway network, assumes all local active transportation plans will be implemented, and dedicates resources to maintain and repair thousands of miles of dilapidated sidewalks. The 2016 Active Transportation Plan also considers new strategies and approaches beyond those proposed in the 2012 RTP/SCS, focusing on ways to augment the plan and active transportation analysis tools in order to:

- Better align active transportation investments with land use and transportation strategies to reduce costs and maximize mobility benefits.
- Increase the competitiveness of local agencies for federal and state funding.
- Develop strategies that serve the 8-80 crowd to reflect changing demographics and make active transportation attractive to a wider audience.

Expand regional understanding of the role short-trips play in achieving 2016 RTP/SCS goals and performance objectives, and provide a strategic framework to support local planning and project development geared toward serving these trips.

3.8.2.3.2 SCAG Bicycle Route 66 Concept Plan (Bike 66 Route)

SCAG's Bike Route 66 is a general guide to improve awareness of Route 66 throughout the region and state. Bike Route 66 traverses 32 cities within Los Angeles and San Bernardino Counties, from Needles to Santa Monica. Establishing a designated route with signage and dedicated bikeways offers commuting, utilitarian, and recreational cyclists a comfortable facility that enhances commute options. For Bike Route 66, a mix of bikeway types is proposed. Class I bikeways cover off-street trails. This class of bikeway incorporates bike paths created from historic transportation assets to provide less stressful alternatives to higher speed streets along Route 66. Class II bikeways cover on-street bike lanes, including Route 66 areas suitable for bicycles or shared-use roadways. Class III bikeways are a series of bike-friendly or low-speed streets that are optimized by bicycle traffic. Overall, Bike Route 66 is a part of the functional network of regional bicycle routes connecting the region and serving commuter, recreational, and touring cyclists. Local jurisdictions are encouraged to use this concept plan to develop, refine, and manage Bike Route 66 in a manner that best serves their areas.

3.8.2.3.3 SCAG Regional Bikeway Plan

The proposed 2016 Active Transportation Plan has developed goals for increasing bikeway miles, increase commute mode share of bicycling and walking, and improve trip connections to transit, and increases the number of sidewalks that are compliant with the Americans with Disabilities Act. To achieve implementation of these goals, SCAG will collaborate with other transportation agencies, local and regional government, and the California Active Transportation Program (ATP) to implement a sustainability program in the six counties region. Currently, the shares of walking and biking in SCAG region combined is approximately 18 percent of the total modes available. SCAG is working with local jurisdictions to increase this percentage. By 2035, at least two-thirds of all trips shorter than three miles or half of all trips that are five miles or less could be converted to active transportation.

3.8.2.3.4 Plans and Policies Related to the Complete Street Act of 2008 (AB 1258; S. 2686)

Complete Streets are designed and operated to enable safe access for all users: pedestrians, bicyclists and motorists, and transit riders of all ages and abilities. The Complete Streets Act of 2008 (AB 1358) required cities and counties to incorporate Complete Streets in their general plan updates to ensure that transportation plans met the needs of all users to travel safely and conveniently on streets and highways. All four counties in the SCAQMD have developed their own bicycle and pedestrian plans. The majority of these bicycle pathways are part of existing Class II paths which provide on-street bike lanes. A few paths are Class I (paths separate from automobile traffic), and some are Class III (pathways with on-street bike lanes further designated by signs).

3.8.2.3.5 Los Angeles County Bicycle Transportation Strategic Plan (BTSP)

Metro developed the BTSP in 2006 to be used by "the cities, the County of Los Angeles and transit agencies in planning bicycle facilities around transit and setting priorities that contribute to regional improvements. The goal is to integrate bicycle use in transportation projects." In addition, Metro also created a Bicycle Transportation Account Compliance Document (BTA Document) to provide an "inventory and mapping of existing and proposed facilities, and an estimate of past and future expenditures for bicycle facilities." In 2013, SCAG and Metro developed the Bike County Data Clearinghouse to assist the county in conducting bicycle counts. The Los Angeles County Department of Public Works adopted a Countywide Bicycle Master Plan in 2012, which was developed with the over-arching goal of increasing "bicycling throughout the County of Los Angeles through the development and implementation of bicycle-friendly policies, programs, and infrastructure." The plan recommends the development of an interconnected network of bicycle corridors, with approximately 695 miles of bikeway facilities. This plan looks at the ridership and air quality benefits from cycling and also includes a list of existing and proposed bikeways in Los Angeles County.

3.8.2.3.6 2011 Orange County Bikeways Strategic Plan

The 2011 Orange County Bikeways Strategic Plan was developed "to encourage the enhancement of Orange County's regional bikeways network, in order to make bicycle commuting a more viable and attractive travel option." The plan identifies approximately 116 miles of priority bikeway projects. In 2012, the OCTA provided an addendum to the existing plan with the Commuter Bikeways Strategic Plan (CBSP) that refines the regional bikeway networks and specified which bikeways are connected to priority locations including major transit investment areas, employment centers, stations, colleges, and universities.

3.8.2.3.7 Riverside County Non-Motorized Transportation Plans

The Western Riverside Council of Governments (WRCOG) and the Coachella Valley Association of Governments (CVAG) have developed Non-Motorized Transportation Plans in 2010 for their respective jurisdictions covering most of Riverside County. WRCOG's 2010 Non-Motorized Transportation Plan proposes the development of over 440 miles of bikeways in order to provide a "regional backbone network of bicycle and pedestrian facilities to provide enhanced transportation mobility options." The 2010 CVAG Non-Motorized Transportation plan recognizes the "value of providing opportunities for local residents and visitors to bicycle for work and recreation, as well as to use off-road trails for hiking, equestrians and jogging."

3.8.2.3.8 San Bernardino County Non-Motorized Transportation Plans

The Revised 2015 San Bernardino County Non-Motorized Transportation Plan's goals include: (1) improving pedestrian access to transit; (2) removing existing barriers to pedestrian travel; (3) developing regional trails and pathways, which provide improved pedestrian access to destinations; and (4) improving the pedestrian environment on major regional arterials and at regional activity centers. Pedestrian access, mobility, and health benefits are captured in the revised plan.

3.8.2.3.9 Active Transportation Plans

In addition to county plans, many local jurisdictions have developed their own active transportation plans or include active transportation components in the circulation element of their general plans. Many street enhancement projects or capital improvement projects include active transportation elements as well. For example, many street improvement projects may include the striping of bikeways or new developments may include sidewalk enhancements.

3.8.2.4 Local Regulatory Framework

3.8.2.4.1 County General Plans-Circulation Element

Each of the four counties within the SCAQMD region have prepared a transportation or circulation element, as a required component of the general plan. The transportation or circulation element provides a summary of the existing conditions in the planning area, major issues, goals, and policies, as well as pertinent action programs related to traffic and circulation related to a variety of transportation systems (highway and local road networks, bus, rail, high speed rail, aviation network, harbors, bicycles, pedestrians, and rideshare). The transportation or circulation Element describes the major locations and corridors for existing and future travel based on land use patterns in order to develop a comprehensive, coordinated, and continuing transportation system for the region. Relevant policies include encouraging provision of transit service at a reasonable cost to the users and the community, encouraging the efficient use and conservation of energy and ease congestion, and, where the land use would support, providing for development of a mass transportation system that will provide a viable alternative to the automobile, and support a balance in transportation modes with public transit system that provides accessible service, particularly to the transit dependent. A transportation system will operate at regional, countywide, community, and neighborhood scales to provide connectivity between communities and mobility between jobs, residences, and recreational opportunities.

3.8.2.4.2 County General Plans-Safety Element

Each of the four counties in the SCAQMD has prepared a safety element as a required component of the general plan. The safety element generally discusses measures to abate the impacts in case of catastrophe for maintenance of the transportation infrastructure. The Traffic and Transportation Division under each county is responsible for developing plans and guidelines for the maintenance of traffic control devices, emergency travel routes in the event of an emergency, placement of barricades, and control of traffic and coordination with other departments to promote integrated disaster planning, response and mitigation efforts. Included in the safety element discussion are strategies for continuation of adequate critical infrastructure systems and services to assure adequate circulation, communications, and transportation services for emergency response in the event of disaster related systems disruptions.

3.8.2.4.3 City of Los Angeles Mobility Plan

The City of Los Angeles Transportation Element of the General Plan was adopted in 1999. In 2015, the city adopted the Mobility Plan 2035, which is an update to the 1999 Transportation Element (City of Los Angeles, 2015). The purpose of the Mobility Plan is to present a guide to the further development of a citywide transportation system which provides for the efficient movement of people and goods. This Mobility Plan recognizes that primary emphasis must be placed on maximizing the efficiency of existing and proposed transportation infrastructure through advanced transportation technology, through reduction of vehicle trips, and through focusing growth in proximity to public transit. The Mobility Plan also recognizes that locating land uses that better serve the needs of the population closer to where they work and live reduces the number and distance of vehicle trips and decreases the amount of pollution from mobile sources. The Mobility Plan provides numerous policies to enhance transportation systems in the city. For example, Policy 5.2 supports ways to reduce VMT per capita. The Mobility Element identifies the major roadways and designated truck routes throughout the City.

3.8.3 EXISTING TRANSPORTATION AND TRAFFIC SETTING

The Southern California transportation system is a complex intermodal network designed to carry both people and goods. It consists of roads and highways, transit, passenger and freight rail, airports, seaports, and intermodal terminals. The regional roadway system consists of an interconnected network of interstates, freeways, highways, toll roads, arterial streets, and local streets. This roadway network allows for the operation and movement of private vehicles, commercial vehicles, private and public buses, and heavy-duty trucks. Active transportation modes, such as biking and walking use non-motorized transportation facilities, including bikeways and walkways that often share spaces with roadway facilities. SCAG is currently working on engaging local jurisdictions to expand bicycle and pedestrian networks to encourage use of active transportation modes, establish safe routes to school, and educate bicyclists and pedestrians on activities around sensitive communities. The regional public transit system includes local shuttles, municipal and area-wide bus operations, light rail transit operations, regional commuter rail services, and interregional passenger rail service. The freight railroad network includes an extensive system of rail lines serving industrial cargo and goods. The airport system consists of commercial, general, and military aviation facilities serving passenger, freight, business, recreational, and defense needs. The region's seaports support substantial international and interregional freight movement and tourist travel. Intermodal terminals consist of freight processing facilities, which transfer, store, and distribute goods. The interconnected and complex transportation system advances the region's mobility and supports the region's economic growth, as well as the demand for safe personal travel.

3.8.3.1 Transportation Planning

Numerous agencies are responsible for transportation planning and investment decisions within the Southern California area. SCAG helps integrate the transportation-planning activities in the region to ensure a balanced, multimodal plan that meets regional as well as county, sub-regional, and local goals.

Table 3.8-1 identifies local and state agencies that participate in the development of an RTP. Seven major entities and agencies are involved (including SCAG) as designated MPOs: the County Transportation Commissions, Subregional Councils of Governments, local and county governments, transit and transportation owners, operators and implementing agencies, resource/regulating agencies and other private non-profit organizations, interest groups and tribal nations.

TABLE 3.8-1

Stakeholders in Transportation in the Southern California Area

COUNTY TRANSPORTATION COMMISSIONS
Los Angeles County Metropolitan Transportation Authority (Metro)
Orange County Transportation Authority (OCTA)
Riverside County Transportation Commission (RCTC)
SUBREGIONAL COUNCILS OF GOVERNMENTS
Southern California Association of Governments (SCAG)
San Bernardino Associated Governments (SANBAG)(1)
Coachella Valley Association of Governments (CVAG)
City of Los Angeles
North Los Angeles County
Orange County Council of Governments
San Fernando Council of Governments
San Gabriel Valley Council of Governments
Western Riverside County Council of Governments
Westside Cities Council of Governments
OTHERS
Caltrans
Airport Authorities
Port Authorities
Transportation Corridor Agencies
Transit/Rail Operators

Source: SCAG, 2016

(1) SANBAG is the transportation planning agency for San Bernardino County and is responsible for cooperative regional planning and furthering an efficient multi-modal transportation system countywide.

Each of the four counties within the jurisdiction of the SCAQMD has a Transportation Commission or Authority. These agencies are charged with countywide transportation planning activities, allocation of locally generated transportation revenues, and in some cases operation of transit services. In addition, there are many subregional Councils of Government within the Southern California area. A Council of Governments is a group of cities and communities geographically clustered and sometimes comprises an entire county (e.g., Orange County), which work together to identify, prioritize, and seek transportation funding for needed investments in their respective service areas.

3.8.3.2 Circulation System

3.8.3.2.1 Commute Patterns and Travel Characteristics

The existing transportation network serving the Southern California region supports the movement of people and goods. On a typical weekday in the six-county region, the transportation network supports a total of nearly 448 million VMT and nearly 13 million vehicle hours of travel (VHT). Of this total, over half occur in Los Angeles County and less in Orange, San Bernardino, and Riverside Counties (see Tables 3.8-2 and 3.8-3) (SCAG, 2016). For more information on the daily vehicle miles, please refer to SCAG's Final 2016 RTP/SCS.

TABLE 3.8-2

Summary of Existing Daily Vehicle Miles

County	Vehicle-Miles Travel (VMT)					
	AM Peak Period		PM Peak Period		Daily	
	Miles	% of Region	Miles	% of Region	Miles	% of Region
Los Angeles	43,216,977	54%	74,635,000	54%	225,544,016	53%
Orange	14,756,181	19%	24,793,000	18%	76,505,802	18%
Riverside	10,424,649	13%	18,817,000	14%	58,224,510	14%
San Bernardino	11,118,720	14%	18,944,000	14%	62,311,825	15%
Total	**79,156,527**	**100%**	**137,189,000**	**100%**	**422,586,153**	**100%**

Source: SCAG, 2016
Note: Data presented is for the entire counties and not limited to the portion of counties located within the jurisdiction of the SCAQMD.

Much of the existing travel in the Southern California region takes place during periods of congestion, particularly during the morning (6:00 a.m. to 9:00 a.m.) and evening peak periods (3:00 p.m. to 7:00 p.m.) (SCAG, 2016).

TABLE 3.8-3

Summary of Existing Daily Vehicle Hours of Travel

County	Vehicle Hours of Travel (VHT)					
	AM Peak Period		PM Peak Period		Daily	
	Hours	% of Region	Hours	% of Region	Hours	% of Region
Los Angeles	1,462,755	60%	2,639,343	61%	7,159,240	59%
Orange	463,633	19%	841,818	20%	2,265,450	19%
Riverside	240,365	10%	402,747	9%	1,287,880	11%
San Bernardino	263,319	11%	429,208	10%	1,391,850	11%
Total	**2,430,072**	**100%**	**4,313,116**	**100%**	**12,104,420**	**100%**

Source: SCAG, 2016
Note: Data presented is for the entire counties and not limited to the portion of counties located within the jurisdiction of the SCAQMD.

Congestion can be quantified as the amount of travel that takes place in delay (vehicle hours of delay or VHD) and, alternately, as the percentage of all travel time that occurs in delay (defined as the travel time spent on the highway due to congestion, which is the difference between VHT at free-flow speeds and VHT at congested speeds). Existing travel delays and percent of regional VHT in delay on freeways and arterials is the greatest (67 percent) in Los Angeles County, with an average of 17 percent in the Southern California region (see Table 3.8-4). While there is a relatively small variation in average travel distance from home to work (from 13 miles in Orange County, to 18 miles in Riverside and San Bernardino Counties), the average travel time during the peak hours ranges from a low of 21 minutes in the a.m. peak hour in Orange County to a high of 116 minutes in San Bernardino County (see Table 3.8-4). Home-to-work trip duration and distance are both greater for the inland counties of Riverside and San Bernardino, reflecting regional housing and employment distribution patterns.

TABLE 3.8-4

Summary of Existing Delay and Work Trip Length

County	Vehicle Hours of Delay			% of Travel in Delay			Average Home-to-Work Trip Distance (miles)	Average Home-to-Work Trip Duration (miles)	
	A.M. Peak Period	P.M. Peak Period	Daily	A.M Peak Period	P.M. Peak Period	Daily	Vehicle Trips (A.M. Only)	Vehicle Trips (A.M. Only)	Transit Trips (A.M. Only)
Los Angeles	472,560	1,039,218	2,000,016	67%	67%	67%	14	26	69
Orange	140,319	320,755	578,293	20%	21%	19%	13	21	78
Riverside	33,522	73,436	149,383	5%	5%	5%	18	29	95
San Bernardino	45,114	85,902	186,160	6%	6%	6%	18	29	116
Total/Avg.	**691,515**	**1,519,311**	**2,913,852**	**25%**	**25%**	**24%**	**16**	**26**	**90**

Source: SCAG, 2016

The characteristics of home-to-work trip and all daily trips vary widely among counties (see Table 3.8-5). On average, vehicular trips account for nearly 90 percent of home to work trips, including 75.8 percent in single occupancy trips, 3.6 percent in two person carpools, 1.8 percent in three-person carpools, and 8.2 percent in auto passenger trips. When accounting for all daily trips, on average vehicular trips account for approximately 86 percent of all daily trips, including 43.3 percent in single occupancy trips, 8.0 percent in two-person carpools, 7.7 percent in three-person carpools, and 27.6 percent in auto passenger trips. Public transit in all forms (including school buses) carries approximately 2.4 percent of all trips in the Southern California region. Of these, the greatest number of travelers is carried by buses, with lesser patronage on Metro Rail, paratransit, commuter rail, and other forms of public transit services. Trips made via public transit account for 6.1 percent of all home-to-work trips in the region and 2.4 percent of all daily trips (Table 3.8-3). Non-motorized trips account for 4.0 percent of all home-to-work trips in the region and 11 percent of all daily trips (see Table 3.8-5) (SCAG, 2016).

TABLE 3.8-5

Existing Travel Mode Split (Percentage of County Total)

County	Person Type Trip	Drive Alone	Two-Person Carpool	Three-Person Carpool	Auto Passenger Trip	Transit	Non-Motorized	Total
Los Angeles	Home-Work/Univ	73.8%	3.5%	1.9%	8.2%	7.5%	5.1%	100%
	All Day Trips	39.9%	7.5%	8.2%	28.5%	3.2%	12.7%	100%
Orange	Home-Work/Univ	79.0%	3.9%	1.8%	8.4%	2.2%	4.6%	100%
	All Day Trips	44.2%	7.9%	8.0%	28.2%	1.0%	10.7%	100%
Riverside	Home-Work/Univ	81.2%	3.5%	2.2%	9.1%	0.7%	3.3%	100%
	All Day Trips	45.6%	8.2%	7.5%	27.1%	0.4%	11.1%	100%
Ventura	Home-Work/Univ	80.1%	3.6%	2.4%	9.6%	1.0%	3.4%	100%
	All Day Trips	45.5%	8.2%	7.6%	27.3%	0.4%	11.0%	100%

3.8.3.2.2 Regional Freeway, Highway, and Arterial System

The regional freeway, highway, and arterial system is the primary means of person and freight movement for the region (see Table 3.8-6). This system provides for direct auto, bus and truck access to employment, services and goods. The network of freeways, interstates, and highways serves as the backbone of the system offering very high capacity limited-access travel and serving as the primary heavy-duty truck route system. The rate of deterioration is expected to accelerate significantly as maintenance cost continues to be deferred on to roadway systems such that to bring back these assets to a state of good repair would improve security and lead to efficiency although costly. The Southern California region will focus on preserving the existing transportation network, including preservation of roads, highways, bridges, railways, bicycle and pedestrian facilities, and transit infrastructures that lead to maintain mobility and provide cost-efficiency without increasing capacity (SCAG, 2016).

TABLE 3.8-6

Existing Regional Freeway Route Miles and Lane Miles by County

County	Freeway Route Miles	Freeway Lane Miles
Los Angeles	538	4,231
Orange	201	1,525
Riverside	298	1,697
San Bernardino	453	2,471
Total	**1,490**	**9,924**

Source: SCAG, 2016

3.8.3.2.3 Regional High-Occupancy Vehicle (HOV) System and Park and Ride System

The regional HOV system consists of exclusive lanes on freeways and arterials, as well as busways and exclusive rights-of-way dedicated to the use of high-occupancy vehicles (HOVs). It includes lanes on freeways, ramps and freeway-to-freeway connectors (see Table 3.8-7). The regional HOV system is designed to maximize the person-carrying capacity of the freeway system through the encouragement of shared-ride travel modes. HOV lanes operate at a minimum occupancy threshold of either two or three persons. Many include on-line and off-line park and ride facilities, and several HOV lanes are full "transitways" including on-line and off-line stations for buses to board passengers (SCAG, 2016).

TABLE 3.8-7

Existing Regional HOV Lane Miles by County

County	HOV Total Lane Miles
Los Angeles	507
Orange	244
Riverside	82
San Bernardino	105
Total	**938**

Source: SCAG, 2016

Park & Ride facilities are generally located at the urban fringe along heavily traveled freeway and transit corridors and support shared-ride trips, either by transit or by carpool or vanpool. Most rail transit stations have park and ride lots nearby. Park & Ride lots in the Southern California region include: 106 in Los Angeles County; 25 in Orange County; 26 in Riverside County; and, 18 in San Bernardino County.

3.8.3.2.4 Arterial Street System

The local street system provides access for local businesses and residents. Arterials account for over 80 percent of the total road network and carry a high percentage of total traffic (see Table 3.8-8). In many cases arterials serve as alternate parallel routes to congested freeway corridors. Peak period congestion on the arterial street system occurs generally in the vicinity of activity centers, at bottleneck intersections, and near many freeway interchanges.

TABLE 3.8-8

Existing Regional Arterial Route Miles and Lane Miles by County

County	Arterials	Lane Miles
Los Angeles	Principal	8,349
	Minor	8,946
Orange	Principal	3,493
	Minor	2,729
Riverside	Principal	1,208
	Minor	2,871
San Bernardino	Principal	1,799
	Minor	3,865
Total	**Principal**	**14,849**
	Minor	**18,411**

Source: SCAG, 2016

3.8.3.2.5 Goods Movement

Wholesale and retail trade, transportation, and manufacturing support approximately 3.3 million jobs in the southern California region according to statistics provided by the state's Employment Development Department. Goods movement includes trucking, rail freight, air cargo, marine cargo, and both domestic and international freight, the latter entering the country via the seaports, airports, and the international border with Mexico. Additionally, many cargo movements are intermodal, for example, sea to truck, sea to rail, air to truck, or truck to rail. The goods movement system includes not only highways, railroads, sea lanes, and airways, but also intermodal terminals, truck terminals, railyards, warehousing, freight consolidation/de-consolidation terminals, freight forwarding, package express, customs inspection stations, truck stops, and truck queuing areas (SCAG, 2016).

3.8.3.2.6 Heavy-Duty Trucks

One of the key components of the Southern California regional goods movement system is the fleet of heavy-duty trucks, defined as cargo-carrying vehicles with a gross weight rating in excess of 8,500 pounds. Trucks provide a vital link in the distribution of all types of goods between the region's ports (sea and air), railroads, warehouses, factories, farms, construction sites and stores. The size and weight of heavy-duty trucks gives them unique operating characteristics; that is, they accelerate and decelerate more slowly than lighter vehicles and require more road space to maneuver. Dedicated truck lanes currently exist at two major freeway interchanges: the junction of Interstate 5 (I-5) with Interstate 210 and State Route 14 and the junction of Interstate 405 with Interstate 110. In addition, truck climbing lanes are located on northbound I-5 in northern Los Angeles County.

The trucking industry, including common carrier, private carrier, contract carrier, drayage and owner-operator services, handles both line-haul and pick-up and delivery. The industry uses the public highway system for over-the-road and local service. However, it is also served by a considerable infrastructure of its own. This infrastructure includes truck terminals, warehousing, consolidation and trans-loading facilities, freight forwarders, truck stops and maintenance facilities. These various facilities are especially prevalent in the case in the South Bay and Gateway Cities areas, including Wilmington and Carson and extending generally between Los Angeles International Airport (LAX) and the San Pedro Bay Ports, along the I-710 Corridor north to Vernon, Commerce, and Downtown Los Angeles, east through the San Gabriel Valley to Industry, Pomona, and Ontario and then to the Inland Empire in Fontana and Rialto as well as in Glendale, Burbank and Bakersfield. Specialized facilities for trucking that provide air cargo ground transport are located around regional airport facilities, notably LAX and Ontario International Airport (SCAG, 2016).

3.8.3.2.7 Railroads

The Basin is served by two main line commercial freight railroads—the Burlington Northern Santa Fe Railway Co. (BNSF) and the Union Pacific Railroad (UP). These railroads link Southern California with other United States regions, Mexico, and Canada either directly or via their connections with other railroads. They also provide freight rail service within California. In 2012, railroads moved approximately 154.8 million tons of cargo throughout California (SCAG, 2016).

The Basin is also served by two short line or switching railroads. The Pacific Harbor Line (formerly the Harbor Belt Railroad), which handles all rail coordination involving the Ports of Los Angeles and Long Beach, including dispatching and local switching in the harbor area, and the Los Angeles Junction Railway Company (owned by BNSF) which provides switching service in the Vernon area for both BNSF and UP. These railroads perform specific local functions and serve as feeder lines to the trunk line railroads for moving goods to and from Southern California.

The two main line railroads also maintain and/or serve major facilities in Southern California. Intermodal facilities in Commerce (BNSF-Hobart), East Los Angeles (UP), San Bernardino (BNSF), and Carson near the San Pedro Bay Ports (UP, Intermodal Container Transfer Facility or ICTF); the Los Angeles Transportation Center (UP-LATC); and the UP-City of Commerce yards serve to transport containers received at the Ports of Los Angeles (UP/BNSF) and Long Beach (UP/BNSF) to eastern customers.

All of the major rail freight corridors in the region have some degree of grade separation, but most still have a substantial number of at-grade crossings on major streets with high volumes of vehicular traffic. These crossings cause both safety and reliability problems for the railroads and for those in motor vehicles at the affected crossings. Trespassing on railroad rights-of-way by pedestrians is another safety issue affecting both freight and commuter railroads. As an example of grade separation for rail corridors, the Alameda Corridor, a 20-mile, four-lane freight rail expressway, began operations in April 2002. In 2014, approximately 17,061 intermodal trains transited the Alameda Corridor, an approximate increase of 2.9 percent since 2013 (SCAG, 2016).

3.8.3.2.8 Public Transit

In Southern California public transit service is comprised of local and express buses, transitways, bus rapid transit (BRT), urban rail, including subway and light rail principally centered in the core of Los Angeles County, commuter rail that spans five counties and shuttles/circulators that feed all transportation modes and activity centers (see Table 3.8-9. Transit service is provided by approximately 67 separate public agencies. 12 of these agencies provide 91 percent of the existing public bus transit service. Local service is supplemented by municipal lines and shuttle services. Private bus companies provide additional regional service (SCAG, 2016).

TABLE 3.8-9

Region Annual Fixed Route Transit Ridership

Total Trips	2001	2005	2008	2012
Metro Rail	61,802,000	74,243,000	86,707,000	101,516,533
Commuter Rail	7,398,000	10,693,000	12,681,000	13,155,790
Bus	548,728,000	609,795,000	622,286,000	587,830,836
Total	**617,928,000**	**694,731,000**	**721,674,000**	**702,503,159**
Passenger Miles	**2001**	**2005**	**2008**	**2012**
Metro Rail	339,799,942	442,916,123	524,813,417	597,916,365
Commuter Rail	274,625,402	359,938,222	436,565,493	433,650,956
Bus	2,206,840,397	2,375,502,229	2,461,654,000	2,487,359,821
Total	**2,821,265,741**	**3,178,356,574**	**3,423,032,910**	**3,518,927,142**

Source: SCAG, 2016

Many people depend on reliable transit in Southern California and transit use is growing in the region (see Table 3.8-10). As of 2010, transit agencies in the Southern California region reported approximately 695 million annual boarding (see Table 3.8-10, total for Annual Boardings). This represents growth of 14 percent between 2001 and 2012, but only three percent growth in per capita trips due to population growth. In the same period, Metrolink saw annual ridership grow by 78 percent, and Metro Rail (Los Angeles County) by 64 percent.

TABLE 3.8-10

Statistics For Major Transit Operators for 2010

County	Largest Transit Operator	Average Weekday Boardings	Annual Boardings	Annual Vehicle Revenue Miles (VRM)	Passenger Fares as a percent of Operation Expenses
Fixed Route Bus Service					
Los Angeles	Metro	1,579,000	503,071,000	139,274,000	24.4%
Orange	OCTA	182,000	58,104,000	21,66,000	25.1%
Riverside	RTA	36,000	11,368,000	10,613,000	15.2%
San Bernardino	Omnitrans	49,000	15,685,000	10,035,000	22.9%
Metro Rail – Heavy Rail					
Los Angeles	Metro	150,000	47,906,000	5,885,000	38.7%
Metro Rail – Light Rail					
Los Angeles	Metro	146,000	46,409,000	9,646,000	18.3%
Regional Commuter Rail(1)					
Various	SCRRA(1) (Metrolink)	38,000	12,006,000	10,479,000	42.4%
	TOTAL:	**2,180,000**	**694,549,000**	**185,932,000**	**N/A**

Source: SCAG, 2016

Notes: (1) Metrolink is operated by the Southern California Regional Rail Authority, a joint powers authority much of an 11-member board representing the transportation commissions of Los Angeles (Metro), Orange (OCTA), Riverside (Riverside County Transportation Commission), San Bernardino (SANBAG), and Ventura (Ventura County Transportation Commission) Counties

3.8.3.2.9 Active and Non-Motorized Transport

The ATP was created by Senate Bill 99 (Chapter 359, Statutes of 2013) and Assembly Bill 101 (Chapter 354, Statutes of 2013) to ensure all active modes of transportation, such as biking and walking, would provide active transportation plans in disadvantaged communities as well as the implementation of non-infrastructure projects (i.e. education, enforcement activities). The use of bicycle as a means of transportation has several appealing aspects for an increasing share of travelers.

Biking and walking primarily constitute non-motorized transportation. Non-motorized transportation plays a bigger role in the densely-populated, mixed-landuse areas of the region. Bicycling has positive air quality, economic, and health impacts, and can reduce automobile-related congestion and energy use. Similar to bicycle use, walking can also reduce auto emissions of both criteria pollutants and GHGs from auto trips.

Currently, the average walking and bicycling distances in commutes from the Southern California region is between zero to three miles, although approximately 34 percent of the population walks or bicycles one-quarter to one-half mile, and more than 15 percent walk between one half and one mile per day. Both modes of non-motorized transport would not require consumption of fuel, and can be used for work and non-work purposes. In 2012, biking and walking accounted for approximately 13.4 percent of total trips in Southern California region; 18.7 percent of these trips are originated from school, and 10.4 percent are shopping trips.

Class I bikeways are separate shared-use paths also used by pedestrians, Class II bikeways are striped lanes in streets, and Class III bikeways are signed routes. There are approximately 3,919 bikeway miles in the region, with the majority in Los Angeles County, followed by Riverside and Orange County. Approximately 746 miles are Class I bikeways, 2,150 Class II Bikeways, and 1,021 Class III Bikeways. Bike rack, locker, and station programs are ongoing in a number of cities and among transit operators. In addition, transit operators are integrating bicycle transportation with transit via bus bike racks, bike-on-train programs and bicycle lockers at transit centers (SCAG, 2016).

3.8.3.2.10 Regional Aviation

The Southern California region supports the nation's largest regional airport system in terms of number of airports and aircraft operations, operating in a very complex airspace environment. The region contains 56 public use airports, including six active commercial service airports, 44 general aviation, two active limited-commercial service (commuter) airports, two former military airfields (now public use airports) and two joint-use facilities. The existing following active commercial service airports handle the majority of passenger air traffic.

- Los Angeles International Airport
- John Wayne/Orange County Airport
- Ontario International Airport
- Long Beach Airport
- Burbank/Bob Hope Airport
- Palm Springs International Airport
- Riverside County/March Air Force Base

In all, approximately 86.4 million annual passengers (MAP) were served in the region in 2012, more than double the number served in 1980. In 2013, the regional total aviation demand was 88 MAP. In 2014, LAX led the largest share of air passengers with approximately 76.1 percent, followed by John Wayne Airport at 10.1 percent, Ontario International Airport at 4.5 percent, and Burbank/Bob Hope Airport at 4.3 percent. While none of the individual airports is the largest in the U.S., the region's airports collectively are the busiest of any region in the country. LAX accounts for the largest portion of passenger volume, cargo, and annual operations (SCAG, 2016).

3.8.3.2.11 Port System

The area within the jurisdiction of the SCAQMD is served by two major deep-water seaports. These ports — Long Beach and Los Angeles—handle Asia–North America trade and are served by the two major railroads and numerous trucking companies in Southern California. The Ports of Long Beach and Los Angeles are full-service ports with facilities for containers, autos and various bulk cargoes. With an extensive landside transportation network, the ports moved approximately 310 million metric tons of cargo in 2010. In particular, the San Pedro Bay Ports (Long Beach and Los Angeles) dominate the container trade in the Americas by shipping and receiving more than 11.8 million 20-foot Equivalent Units (TEUs) of containers in 2009. Together these two ports rank third in the world, behind Rotterdam and Hong Kong, as the busiest maritime ports (SCAG, 2016).

3.8.3.2.12 Transportation Security

Southern California is home to significant natural disasters, including earthquakes, wildfires, flooding, and mudslides. Transportation and transit agencies throughout the United States are taking increasing steps to protect their facilities against the threats of crime, terrorist activity, and natural disasters. A large-scale evacuation would be difficult in the Southern California region. The region already has severe traffic congestion and mobility issues. The region encompasses 38,000 square miles with a diverse geography, ranging from dense urban areas, to mountain ranges, to vast deserts. The interdependency of the jurisdictions and organizations makes regional cooperation and coordination essential to security and emergency preparedness. Typically, no single agency is responsible for transportation security. At the local level, especially within transit agencies, safety may be handled within one office. However, it is far less likely that the security of a surface transportation mode is managed by one entity and that this entity is even controlled by the transportation organization. For example, highways and transit networks traverse multiple police jurisdictions, local fire departments generally fill the incident command role after terrorist events, regional command and control centers respond to both natural and intentional disasters, and federal agencies intervene as needed and based on specific guidelines such as the crossing of state boundaries.

The complexity of the Southern California region, with a range of potential terrorism targets, presents significant challenges in coordinating and implementing effective homeland security programs. The unexpected and complex nature of these natural and human-caused incidents require extensive coordination, collaboration and flexibility among all of the agencies and organizations involved in planning, mitigation, response and recovery (SCAG, 2016).

The Department of Homeland Security (DHS) has designated the seaports of Long Beach and Los Angeles as at risk for potential terrorist actions. Security at the ports is the joint responsibility of the U.S. Coast Guard, the U.S. Customs and Border Protection Agency, federal and State Homeland Security offices, Port police agencies, Harbor Patrols and emergency service agencies. The U.S. Coast Guard leads the local Area Maritime Security Commission, which coordinates activities and resources for all port stakeholders. The Port of Los Angeles has a dedicated police force, the Los Angeles Port Police, to patrol the area within the jurisdiction of the Port of Los Angeles. The Port Police enforce federal, State, and local public safety statutes, as well as environmental and maritime safety regulations, in order to maintain the free flow of commerce and produce a safe, secure environment that promotes uninterrupted Port operations. In addition, the Port Police partner with other law enforcement agencies, such as the Los Angeles Police Department, CHP, and Customs and Border Protection in the Cargo Theft Interdiction Program (CTIP), which investigates cargo theft, and the High Intensity Drug Trafficking Area, which targets drug trafficking at the Ports of Los Angeles and Long Beach. Furthermore, per the Maritime Transportation Security Act of 2002, the Port of Los Angeles works with the Coast Guard to develop security plans for facilities at the port.

Similar to the Port of Los Angeles, security at the Port of Long Beach entails physical security enhancements, police patrols, coordination with federal, State, and local agencies to develop security plans for the port area and investigate suspicious incidents, and obtaining federal funding to pay for these enhancements. As with the Port of Los Angeles, the Port of Long Beach works with the Coast Guard to develop security plans for facilities at the port. In contrast to the Port of Los Angeles, however, the Port of Long Beach does not have its own dedicated police force. Instead, the Long Beach Police Department is responsible for patrolling the port area. In doing so, the Port reimburses the Long Beach Police and Fire Departments for their port-related activities and expenses. The Port also funds its own Harbor Patrol to supplement law enforcement work conducted by other agencies such as the Coast Guard (SCAG, 2106).

3.9 AESTHETICS

3.9.1 INTRODUCTION

This subchapter of the 2016 AQMP EIR contains an overview of existing aesthetic resources, including scenic highways and coastal zones within the SCAQMD.

3.9.2 REGULATORY SETTING

3.9.2.1 Federal

Aesthetic resources on federal lands are managed by the federal government using various visual resource management programs, depending on the type of federal land and/or the federal agency involved with a given project. Examples of federal visual resource management programs include the Visual Resource Management System utilized by the Federal Bureau of Land Management (BLM) and the Visual Management System utilized by the United States Forest Service (USFS).

3.9.2.2 State

3.9.2.2.1 California Coastal Act

The California Coastal Act of 1976 was enacted to regulate development projects within California's Coastal Zone. The act includes requirements that protect views and aesthetic resources through siting and design control measures, which are typically implemented at the local planning level through local coastal programs (LCPs) or land use plans (LUPs). According to the California Coastal Act:

> *The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government shall be subordinate to the character of its setting (California Public Resources Code. California Coastal Act [Chapter 3 (Coastal Resources Planning and Management Policies) Article 6, Section 30251]).*

For local jurisdictions that do not have an approved LCP, regulation of development projects within the coastal zone remains under the jurisdiction of the California Coastal Commission (CCC).

3.9.2.2.2 State Scenic Highway Program

California's Scenic Highway Program was created by the California Legislature in 1963 to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of land adjacent to those highways. When a city or county nominates an eligible scenic highway for official designation, it must adopt ordinances to preserve the scenic quality of the corridor or document such regulations that already exist in various portions of local codes. These ordinances make up the scenic corridor protection program.

Scenic corridor protection programs include policies intended to preserve the scenic qualities of the highway corridor, including regulation of land use and density of development, detailed land and site planning, control of outdoor advertising (including a ban on billboards), careful attention to and control of earthmoving and landscaping, and careful attention to design and appearance of structures and equipment (California Streets and Highways Code § 260 et seq.).

3.9.2.3 Local

3.9.2.3.1 Counties and Cities

The geographic area encompassed by the Basin includes numerous cities and unincorporated communities in the counties of Los Angeles, Orange, San Bernardino, and Riverside. Each of these counties and incorporated cities has prepared a general plan, which is the primary document that establishes local land use policies and goals. Many of these general plans also establish local policies related to aesthetics and the preservation of scenic resources within their communities or sub-planning areas, and may include local scenic highway programs.

3.9.2.3.2 Local Coastal Programs

The CCC and the local governments along the coast share responsibility for managing the state's coastal resources. Through coordination with the CCC, coastal cities and counties develop LCPs. These programs are the primary means for carrying out the policies of the California Coastal Act at the local level. In general, these policies are intended to promote public access and enhance recreational use of the coast as well as protection of natural resources in the coastal zone. Examples of counties, cities and local jurisdictions within the SCAQMD that do have an approved LCP or LUP include Los Angeles County and the County of Orange and the cities of Santa Monica, El Segundo, Manhattan Beach, Hermosa Beach, Redondo Beach, Palos Verdes Estates, Rancho Palos Verdes, Long Beach, Avalon, Huntington Beach, Newport Beach, Irvine, Laguna Beach, Laguna Niguel, Dana Point, and San Clemente.

Following approval by the CCC, an LCP is certified and the local governments implement the programs. LCPs include two main components, a land use plan and an implementation plan. These components may include policies or regulations that apply to preservation of visual and scenic resources within the coastal zone. Typically, these policies relate to preservation of views of the coast.

3.9.3 ENVIRONMENTAL SETTING

This environmental setting subchapter describes the aesthetics resources settings that may be adversely affected by the proposed project. Specifically, this environmental setting subchapter describes visual character and quality, visual resources, scenic highways, and coastal zones within the Basin.

3.9.3.1 Visual Character and Quality

Visual character and quality are defined by the built and natural environment. The ***visual character*** of a view is descriptive cataloguing of underlying landforms and landcover including the topography, general land use patterns, scale, form, and the presence of natural areas. Urban features, such as structures, roads, utility lines, and other development associated with human activities also help to define visual character. ***Visual quality*** is an evaluative appraisal of the aesthetics of a view and is established using a well-established approach to visual analysis adopted from the Federal Highway Administration (FHWA) based upon the relative degree of vividness, intactness, and unity found within the visual setting, as defined in the following bullet points (FHWA, 1981):

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

- Intactness is the visual integrity of the landscape and its freedom from encroaching elements; this factor can be present in well-kept urban and rural landscapes, as well as in natural settings.

- Unity is the degree to which the visual resources of the landscape join together to form a coherent, harmonious visual pattern. Unity refers to the compositional harmony or inter-compatibility between landscape elements.

Each of the three criteria is independent and intended to evaluate one aspect of visual quality; however, no one criterion considered alone equates to visual quality.

The perception of visual quality can vary significantly among viewers depending on their level of visual sensitivity (interest). Sensitive viewers' perceptions can vary seasonally and even hourly as weather, light, shadow, and the elements that compose the viewshed change. Form, line, color, and texture are the basic components used to describe visual character and quality for most visual assessments (FHWA, 1981). Sensitivity depends upon the length of time the viewer has access to a particular view. Typically, residential viewers have extended viewing periods and are often concerned about changes in views from their homes. Visual sensitivity is, therefore, considered to be high for neighborhood residential areas. Visual sensitivity is considered to be less important for commuters and other people driving along surrounding streets. Views from vehicles are generally more fleeting and temporary, yet under certain circumstances are sometimes considered important (e.g., viewers who are driving for pleasure, views/vistas from scenic corridors).

Various jurisdictions within the SCAQMD, including cities, counties, and federal or regional agencies, provide guidelines regarding the preservation and enhancement of visual quality in their plans or regulations. An example of such guidance can be found in Caltrans Scenic Highway Guidelines which contains examples of visual intrusions (Caltrans, 2008), which are presented in Table 3.9-1. As the table illustrates, a given visual element may be considered desirable or undesirable, depending on design, location, use, and other considerations. Because of the size and diversity of the area within the SCAQMD's jurisdiction, it is not possible to apply uniform standards to all areas within the Basin.

The viewshed can be defined as all of the surface area visible from a particular location or sequence of locations, and is described in terms of the dominance of landforms, landcover, and manmade development constituting visual character. Views of high visual quality in urban settings generally have several of the following additional characteristics:

- Harmony in scale with the surroundings;
- Context sensitive architectural design; and
- Impressive landscape design features.

Areas of medium visual quality have interesting forms but lack unique architectural design elements or landscape features. Areas of low visual quality have uninteresting features and/or undistinguished architectural design and/or other common elements.

TABLE 3.9-1

Caltrans Scenic Highway Program – Examples of Visual Quality Intrusions

Minor Intrusion	Moderate Intrusion	Major Intrusion
Buildings: *Residential, Commercial, and Industrial Developments*		
Widely dispersed buildings. Natural landscape dominates. Wide setbacks and buildings screened from roadway. Forms, exterior colors and materials are compatible with landscape. Buildings have cultural or historical significance.	Increased numbers of buildings, not well integrated into the landscape. Smaller setbacks and lack of roadway screening. Buildings do not dominate the landscape or obstruct scenic view.	Dense and continuous development. Highly reflective surfaces. Buildings poorly maintained. Visible blight. Development along ridgelines. Buildings dominate the landscape or obstruct scenic view.
Unsightly Land Uses: *Sumps, Quarries, Concrete Plants, Tank Farms, Auto Dismantling*		
Screened from view so that most of facility is not visible from the highway.	Not screened and visible but programmed/funded for removal and site restoration. Land use is visible but does not dominate the landscape or obstruct scenic view.	Not screened and visible by motorists. Will not be removed or modified. Land use dominates the landscape or obstructs scenic view.
Commercial Retail Development		
N/A	Neat and well landscaped. Single story. Generally blends with surroundings. Development is visible but does not dominate the landscape or obstruct scenic view.	Not harmonious with surroundings. Poorly maintained or vacant. Blighted. Development dominates the landscape or obstructs scenic view.
Parking Lots:		
Screened from view so that most of the vehicles and pavement are not visible from the highway.	Neat and well landscaped. Generally blends with surroundings. Pavement and/or vehicles visible but do not dominate the landscape or degrade scenic view.	Not screened or landscaped. Pavement and/or vehicles dominate the landscape or degrade scenic view.
Off-Site Advertising Structures		
N/A	N/A	Billboards degrade or obstruct scenic view.

TABLE 3.9-1 (CONT.)

Caltrans Scenic Highway Program – Examples of Visual Quality Intrusions

Minor Intrusion	Moderate Intrusion	Major Intrusion
Noise Barriers		
N/A	Noise barriers are well landscaped and complement the natural landscape. Noise barriers do not degrade or obstruct scenic view.	Noise barriers degrade or obstruct scenic view.
Power Lines and Communication Facilities		
Not easily visible from road.	Visible, but do not dominate scenic view.	Towers, poles or lines dominate view. Scenic view is degraded.
Agriculture: *Structures, Equipment, Crops*		
Generally blends in with scenic view. Is indicative of regional culture.	Not compatible with the natural landscape. Scale and appearance of structures and equipment visually competes with natural landscape.	Scale and appearance of structures and equipment are incompatible with and dominates natural landscape. Structures, equipment or crops degrade or obstruct scenic view.
Exotic Vegetation		
Used as screening and landscaping. Generally is compatible with scenic view.	Competes with native vegetation for visual dominance.	Incompatible with and dominates natural landscape. Scenic view is degraded.
Clearcutting		
N/A	Clearcutting or deforestation is evident, but is in the distant background.	Clearcutting or deforestation is evident. Scenic view is degraded.
Erosion		
Minor soil erosion (i.e., rill erosion).	Rill erosion starting to form gullies.	Large slip outs and/or gullies with little or no vegetation. Scenic view is degraded.
Grading		
Grading generally blends with adjacent landforms and topography.	Some changes, less engineered appearance and restoration are taking place.	Extensive cut and fill. Unnatural appearance, scarred hillsides or steep slopes with little or no vegetation. Canyons filled in. Scenic view is degraded.
Road Design		
Blends in and complements scenic view. Roadway structures are suitable for location and compatible with landscape	Large cut and fill slopes are visible. Scale and appearance of roadway, structures, and appurtenances are incompatible with landscape.	N/A

Source: Caltrans, 2008

3.9.3.2 Visual Resources

Visual resources include historic buildings that uniquely identify a setting, views identified as significant in local plans, and/or views from scenic highways. The importance of a view to viewers is related to the position of the viewers relative to the resource and the distinctiveness of a particular view. The visibility and visual dominance of landscape elements are usually described with respect to their placement in the viewshed.

Visual resources occur in a diverse array of environments within the boundaries of the SCAQMD, ranging in character from urban centers to rural agricultural land, natural woodlands, and coastal views. The extraordinary range of visual features in the region is afforded by the mixture of climate, topography, flora, and fauna found in the natural environment, and the diversity of style, composition, and distribution of the built environment. Views of the coast from locations in Los Angeles and Orange Counties are considered valuable visual resources, while views of various mountain ranges are prevalent throughout the Basin. Other natural features that may be visually significant in the Basin include rivers, streams, creeks, lakes, and reservoirs.

The Los Angeles County Draft 2014 General Plan identifies regional open space and recognized scenic areas, generally including the Santa Monica Mountains, as well as the San Gabriel Mountains, Verdugo Hills, Santa Susana Mountains, Simi Hills, Santa Monica Mountains, and Puente Hills. In addition, ridgelines and hillsides are generally considered to be scenic resources, with specific measures for the protection of these areas (Los Angeles County, 2014).

The Orange County General Plan identifies the Santa Ana Mountains, along with their distinctive twin peaks known as "Saddleback," as the county's signature landmark. The Plan designates ten scenic "viewscape corridors," which include among others Pacific Coast Highway, Oso Parkway, Ortega Highway, Jamboree Road, Santiago Canyon Road, and Laguna Canyon Road. These designated viewscape corridors provide scenic views of the Santa Ana Mountains, Lomas de Santiago and the San Joaquin Hills, as well as numerous canyons and valleys including the Santa Ana Canyon, Capistrano Valley, Laguna, Aliso, Wood, Moro, San Juan, Trabuco Santiago, Modjeska, Silverado, Limestone, and Black Star Canyons. Finally, the General Plan identifies nearly 42 miles of coastline and approximately 33 miles of sandy beaches as defining scenic resources (Orange County, 2011).

The Riverside County General Plan identifies regional scenic resources, including Santa Ana River basin, Lake Mathews, Lake Perris, Lake Elsinore, Lake Skinner, Vail Lake, the San Jacinto River, Murrieta Creek, the Santa Margarita River, the vineyard/citrus region near Temecula, the Diamond Valley Reservoir, Joshua Tree National Park, Whitewater River, the Santa Rosa Mountains, and a portion of the Salton Sea (Riverside County, 2014).

The County of San Bernardino 2007 General Plan identifies several scenic areas, including the San Gabriel Mountains, the San Bernardino Mountains, La Loma Hills, Jurupa Hills, Chino Hills, Yucaipa Hills, Holcomb Valley, and the Mojave Desert. In addition, Big Bear

Lake, Silverwood Lake, Lake Arrowhead, and Lake Gregory, along with associated waterways, serve as defining characteristics of the mountain regions within the County. San Bernardino County has a wide variety of scenic and wilderness areas respectively categorized as the Mountain, Valley, and Desert regions. Each region has its own defined measures for protecting the specific resources contained in this region. San Bernardino County also considers desert night-sky views to be scenic resources and has enacted measures to reflect this (San Bernardino County, 2014).

In addition to county plans, many of the cities within the SCAQMD have general plan policies, and in some cases, ordinances, related to the protection of visual resources. In addition to the visual resources related to natural areas, many features of the built environment that may also have visual significance include individual or groups of structures that are distinctive due to their aesthetic, historical, social, or cultural significance or characteristics, such as architecturally appealing buildings or groups of buildings, landscaped freeways, bridges or overpasses, and historic resources.

3.9.3.3 Scenic Highways

Within the SCAQMD, there are numerous officially designated state and county scenic highways and one historic parkway, as listed in Table 3.9-2. There are also a number of roadways that have been determined eligible for state scenic highway designation, as listed in Table 3.9-3.

TABLE 3.9-2

Scenic Highways Within SCAQMD Borders

Route	County	Location	Description	Miles	Designation
2	Los Angeles	From near La Cañada Flintridge north to the San Bernardino County line.	This U.S. Forest Service Scenic Byway and State Scenic Highway winds along the spine of the San Gabriel Mountains. It provides views of the mountain peaks, the Mojave Desert, and the Los Angeles Basin.	55	Officially Designated State Scenic Highway(a) (ODSSH)
38	San Bernardino	From east of South Fork Campground to State Lane.	This U.S. Forest Service Scenic Byway and State Scenic Highway crosses the San Bernardino Mountains at Onyx Summit. It features forested mountainsides with far-off desert vistas near the summit.	16	ODSSH
62	Riverside	From I-10 north to the San Bernardino County line.	This highway features high desert country scenery and leads to or from Joshua Tree National Monument. Large “windmill farms,” where wind power is used to generate electricity, can be seen along the way.	9	ODSSH

Source: Caltrans, 2015

TABLE 3.9-3

Highways Within SCAQMD Boundaries Eligible for State Scenic Highway Designation

Route	County	Location (From/To)	Postmiles
1	Orange/LA	I-5 south of San Juan Capistrano/SR-19 near Long Beach	0.0-3.6
1	LA/(Ventura)	SR-187 near Santa Monica/SR-101 near El Rio	32.2-21.1
2	LA/SBD	SR-210 in La Cañada Flintridge/SR 138 via Wrightwood	22.9-6.36
5	(SD)/Orange	Opposite Coronado/SR-74 near San Juan Capistrano	R14.0-9.6
5	LA	I-210 near Tunnel Station/SR-136 near Castaic	R44.0-R55.5
10	SBD/Riverside	SR-38 near Redlands/SR-62 near Whitewater	T0.0-R10.0
15	(SD)/Riverside	SR-76 near San Luis Rey River/SR-91 near Corona	R46.5-41.5
15	SBD	SR-58 near Barstow/SR-127 near Baker	76.9-R136.6
18	SBD	SR-138 near Mt. Anderson/SR-247 near Lucerne Valley	R17.7-73.8
27	LA	SR-1/Mulholland Drive	0.0-11.1

TABLE 3.9-3 (CONT.)

Highways Within SCAQMD Boundaries Eligible for State Scenic Highway Designation

Route	County	Location (From/To)	Postmiles
30	SBD	SR-330 near Highland/I-10 near Redlands	T29.5-33.3
38	SBD	I-10 near Redlands/SR-18 near Fawnskin	0.0-49.5
39	LA	SR-210 near Azusa/SR-2	14.1-44.4
40	SBD	Barstow/Needles	0.0-154.6
57	Orange/LA	SR-90/SR-60 near City of Industry	19.9-R4.5
58	(Kern)/SBD	SR-14 near Mojave/I-15 near Barstow	112.0-R4.5
62	Riverside/SBD	I-10 near Whitewater/Arizona State Line	0.0-142.7
71	Riverside	SR-91 near Corona/SR-83 north of Corona	0.0-G3.0
74	Orange/Riverside	I-5 near San Juan Capistrano/I-111 (All)	0.0-R96.0
79	(SD)/Riverside	SR-78 near Santa Ysabel/SR-371 near Aguanga	20.2-2.3
91	Orange/Riverside	SR-55 near Santa Ana Canyon/I-15 near Corona	R9.2-7.5
101	LA/(Ventura)/ (SBar)/(SLO)	SR-27 (Topanga Canyon Blvd)/SR-46 near Paso Robles	25.3-57.9
111	(Imperial)/ Riverside	Bombay Beach-Salton Sea/SR-195 near Mecca	57.6-18.4
111	Riverside	SR-74 near Palm Desert/I-10 near Whitewater	39.6-R63.4
118	(Ventura)/LA	SR-23/Desoto Avenue near Browns Canyon	17.4-R2.7
126	(Ventura)/LA	SR-150 near Santa Paula/I-5 near Castaic	R12.0-0R5.8
127	SBD/(Inyo)	I-15 near Baker/Nevada State Line	L0.0-49.4
138	SBD	SR-2 near Wrightwood/SR-18 near Mt. Anderson	6.6-R37.9

TABLE 3.9-3 (CONCLUDED)

Highways Within SCAQMD Boundaries Eligible for State Scenic Highway Designation

142	SBD	Orange County Line/Peyton Drive	0.0-4.4
173	SBD	SR-138 near Silverwood Lake/SR-18 south of Lake Arrowhead	0.0-23.0
210	LA	I-5 near Tunnel Station/SR-134	R0.0-R25.0
215	Riverside	SR-74 near Romoland/SR-74 near Perris	23.5-26.3
243	Riverside	SR-74 near Mountain Center/I-10 near Banning	0.0-29.7
247	SBD	SR-62 near Yucca Valley/I-15 near Barstow	0.0-78.1
330	SBD	SR-30 near Highland/SR-18 near Running Springs	29.5-44.1

Source: Caltans, 2015a
Notes: LA = Los Angeles SBD = San Bernardino SD = San Diego
SBar = Santa Barbara SLO = San Luis Obispo SR = State Route
( ) = County not within the SCAQMD

3.9.3.4 Coastal Zones

According to the California Coastal Act of 1976, a coastal zone is the land and water area of the State of California from the Oregon border to the border of Mexico, extending seaward to the state's outer limit of jurisdiction (including all offshore islands), and extending inland generally 1,000 yards from the mean high tide line of the sea. In significant coastal estuarine, habitat, and recreational areas, the coastal zone extends inland to the first major ridgeline paralleling the sea or five miles from the mean high tide line of the sea, whichever is less, and in developed urban areas the coastal zone generally extends inland less than 1,000 yards.

The coastal zone within the Basin generally extends from Leo Carrillo State Park in Malibu in the northwestern corner of Los Angeles County to San Clemente Beach in San Clemente near the southern tip of Orange County.

LCPs typically contain policies on visual access and site development review. LCPs are basic planning tools used by local governments to guide development in the coastal zone, in partnership with the CCC. LCPs contain the ground rules for future development and protection of coastal resources in the 75 coastal cities and counties. The LCPs specify appropriate location, type, and scale of new, or changed, uses of land and water. Each LCP includes a land use plan and measures to implement the plan (such as zoning ordinances). Prepared by local government, these programs govern decisions that determine the short- and long-term conservation and use of coastal resources. While each LCP reflects unique characteristics of individual local coastal communities, regional and statewide interests and concerns must also be addressed in conformity with California Coastal Act goals and policies.

CHAPTER 4

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.0 Introduction
4.1 Air Quality and Greenhouse Gas Emissions
4.2 Energy
4.3 Hazards and Hazardous Materials
4.4 Hydrology and Water Quality
4.5 Noise
4.6 Solid and Hazardous Waste
4.7 Transportation and Traffic
4.8 Aesthetics
4.9 Potential Impacts Found Not to be Significant
4.10 Other CEQA Topics

4.0 INTRODUCTION

The CEQA Guidelines require EIRs to identify significant environmental effects that may result from a proposed project [CEQA Guidelines §15126.2(a)]. Direct and indirect significant effects of a project on the environment should be identified and described, with consideration given to both short- and long-term impacts. The discussion of environmental impacts may include, but is not limited to, the resources involved; physical changes; alterations of ecological systems; health and safety impacts caused by physical changes; and other aspects of the resource base, including water quality, public services, etc. If significant adverse environmental impacts are identified, the CEQA Guidelines require a discussion of measures that could either avoid or substantially reduce any adverse environmental impacts to the greatest extent feasible (CEQA Guidelines §15126.4).

The CEQA Guidelines indicate that the degree of specificity required in a CEQA document depends on the type of project being proposed (CEQA Guidelines §15146). The detail of the environmental analysis for certain types of projects cannot be as great as for others. For example, an EIR for a project, such as the adoption or amendment of a comprehensive zoning ordinance or a local general plan, should focus on the secondary effects that can be expected to subsequently occur as a result of the adoption or amendment, but the analysis need not be as detailed as the analysis of any specific construction project(s) that may also occur. As a result, this Program EIR analyzes impacts on a regional level, impacts on the subregional level, and impacts on the level of individual projects or individual facilities only where feasible.

Chapter 4 analyzes the potential environmental impacts of implementing the 2016 AQMP. The goal of the 2016 AQMP is to address the federal 2008 eight-hour ozone standard, the 2012 annual PM2.5 standard, and the 2006 24-hour PM2.5 standard, in order to satisfy the planning requirements of the federal CAA, and to provide an update on the strategy to meet the 1997 8-hour ozone NAAQS and 1979 1-hour ozone NAAQS. The 2016 AQMP also provides a preliminary evaluation of the 2015 federal 8-hour ozone standard (70 ppb). Some of the proposed control measures intended to improve overall air quality may have direct or indirect energy impacts associated with their implementation. The energy subsection describes the existing setting related to energy production and demand within California and the Basin.

This chapter is subdivided into the following sections based on the area of potential impacts: air quality and greenhouse gases, energy, hazards and hazardous materials, hydrology and water quality, noise, traffic and transportation, and solid and hazardous waste. Included for each impact category is a discussion of project-specific impacts, project-specific mitigation (if necessary and feasible), remaining impacts, and a summary of impacts for each resource. Also, included within each resource evaluation is a summary of impacts that would be expected for implementation of the various Control Measures. Full descriptions of all 2016 AQMP control measures are provided in Chapter 4 of the Draft Final 2016 AQMP and Appendices IV-A, IV-B, and IV-C.

In order to address the full range of potential environmental impacts several assumptions were made for purposes of evaluation. First, to provide a "worst-case" analysis, the environmental analysis contained herein assumes that the control measures contained in the AQMP apply to the entire SCAQMD jurisdiction (i.e., the Basin and those portions of the MDAB and SSAB under the SCAQMD's jurisdiction). If control equipment, which may create secondary adverse environmental impacts, could be used to comply with a particular control measure, it was assumed that such equipment would be employed even if it may not be the only technology or method of compliance available. For example, in the analysis of energy impacts, all vehicles in ONRD-01 were assumed to be electrified. However, the energy impacts analysis also included that alternative fuels (e.g., natural gas) may also be utilized when implementing ONRD-01. To take into account the wide variety of implementation possibilities and corresponding potential environmental effects, this approach was applied when analyzing each environmental topic. In practice, there are typically a number of ways to comply with requirements of SCAQMD rules, but often only one type of compliance option may actually be implemented. For this reason, this conservative approach to analyzing the environmental effects has the potential to substantially overestimate impacts.

Every control measure in the 2016 AQMP was evaluated to determine whether or not it has the potential to generate adverse environmental impacts. Each environmental topic subchapter in Chapter 4 contains a table identifying control measures with the potential to generate significant adverse impacts for that environmental topic. Table 4.0-1 lists the various control measures which were evaluated and determined not to have significant adverse impacts on the environment and, therefore, were not evaluated further.

There are several reasons why the control measures in Table 4.0-1 are not expected to generate significant adverse impacts. First, ECC-01 and ECC-02 are measures that seek to take credit for the emission reductions of criteria pollutants which would occur due to existing regulations targeting energy efficiency and GHG reductions. FUG-01, MCS-01, and ORHD-01 would largely control emissions through enhanced inspection and maintenance practices. Inspection and maintenance practices contain procedures to ensure the proper operation of equipment, and thus, are not expected to generate secondary impacts. MOB-14 is an administrative control measure that would allow the SCAQMD to take credit for past emissions reductions and would not generate any additional physical environmental impacts. ORLD-02 would not result in environmental impacts because it would only study the Smog Check Inspection program. Finally, ORFIS-02 would seek emissions reductions from marine vessels and would also not result in environmental impacts.

In addition, there are several control measures proposed in the 2016 AQMP for which there is insufficient information regarding compliance options or how they would be implemented to determine the potential impacts (see Table 4.0-2). For example, because MCS-02, ORHD-03, OFFS-02, and OFFS-03 depend on future technologies, it would be speculative to determine what, if any, impacts could be expected from these control measures when the type of technologies that may actually be utilized is unknown. FLX-01 involves outreach and education so that consumers can make informed choices when making purchasing decisions, conducting efficiency upgrades, installing clean energy sources, and employing approaches for energy conservation. FLX-01 is a voluntary measure that would educate the public in general; thus, any impacts associated with changes in behavior would also be considered speculative. Therefore, the impacts of MCS-02, ORHD-03, OFFS-02, OFFS-03, and FLX-01 would be considered speculative and no further environmental analysis is required (CEQA Guidelines §15145).

TABLE 4.0-1

Control Measures With No Expected Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	REASON NOT SIGNIFICANT
ECC-01	Co-Benefit Emission Reductions from GHG Programs	Take credit for criteria pollutant reductions due to compliance with state regulations targeting GHG reductions.	This measure will quantify the co-benefits from emission reductions achieved by existing regulations already in place with no new physical impacts.
ECC-02	Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures (NOx, VOC)	Take credit for NOx and VOC emission reductions which would occur due to compliance with required energy efficiency mandates and state regulations.	This measure will quantify the co-benefits from emission reductions achieved by existing regulations already in place with no physical impacts.
FUG-01	Improved Leak Detection and Repair (VOC)	Changes in testing, increase self-inspection, and enforcement procedure for leaks.	Increased inspection and enforcement would not generate physical impacts.
MCS-01	Improved Breakdown Procedures and Process Re-design (all pollutants)	Changes in operating practices, testing, increase self-inspection, and enforcement procedures for equipment breakdowns.	Increased inspection, enforcement, and testing would not generate physical impacts.
MCS-02	Application of All Feasible Measures (all pollutants)	Implementation of rulemaking to establish emission limits for future BARCT analysis.	Impacts are speculative as it would depend on unknown future technologies.
FLX-01	Improved Education and Public Outreach (all pollutants)	Increased education and public outreach to guide consumer behavior.	Impacts are speculative as the effectiveness of education and outreach is unknown.
ORLD-02	Lower In-Use Emission Performance Assessment (TBD)[1]	Study to evaluate effectiveness of the ongoing Smog Check Inspection program.	No physical impacts are associated with the effectiveness evaluation.
ORHD-01	Lower In-Use Emissions Performance Level for Heavy Duty Vehicles (TBD)	Changes in operating practice, vehicle testing, increase self-inspection and enforcement of violations.	Increased testing, inspection, and enforcement would not generate physical impacts.
ORHD-03	Medium and Heavy Duty GHG Phase 2 (all pollutants)	Promote changes in car design to improve energy efficiency.	Impacts are speculative as the design of future cars is unknown.
ORFIS-02	Tier 4 Vessel Standards (NOx)	Petition that new vessels must meet Tier 4 IMO standards by 2025.	No physical impacts associated with the development of new standard for new vessels.
OFFS-02	Zero Emission Off-Road Emission Reduction Assessment (TBD)	Reliance on the development of future technologies to transition to zero emission off- road equipment.	Impacts are speculative as it would depend on unknown future technologies.
OFFS-03	Zero Emission Off-Road Worksite Emission Reduction Assessment (TBD)	Reliance on the development of future technologies to transition to zero emission off- road worksites.	Impacts are speculative as it would depend on unknown future technologies.

TBD means the pollutants that will be impacts are to be determined.

4.1 AIR QUALITY AND GREENHOUSE GAS EMISSIONS

The purpose of the 2016 AQMP is 1) to address the federal 2008 eight-hour ozone standard, the 2012 annual PM2.5 standard, and the 2006 24-hour PM2.5 standard, in order to satisfy the planning requirements of the federal CAA, and 2) to provide an update on the strategy to meet the 1997 8-hour ozone NAAQS and 1979 1-hour ozone NAAQS. The 2016 AQMP also provides a preliminary evaluation of the 2015 federal 8-hour ozone standard (70 ppb). The 2016 AQMP continues the SCAQMD's strategy of advancing clean technologies, promoting their use, and increasing the penetration of partial-zero and zero emission mobile sources and equipment into the Basin. This subchapter examines potential direct and indirect air quality impacts associated with the implementation of the proposed control measures in the 2016 AQMP.

4.1.1 INTRODUCTION

The analysis of air quality and GHG impacts in the Program EIR identifies the net effect on air quality (e.g., criteria air pollutants, GHGs, and TACs) from implementing the 2016 AQMP. The NOP/IS (Appendix A) determined the air quality impacts of the proposed project are potentially significant. In particular some of the control measures could: 1) generate emissions during the construction phases needed to implement the proposed control measures; 2) generate additional emissions from power plants that would need to expand to produce additional electricity to operate zero and near-zero technologies; 3) generate additional toxic air contaminants (e.g., increased ammonia use and additional TACs associated with reformulated products); 4) generate additional emissions from refineries to produce reformulated or alternative fuels; and 5) generate additional trips to transport materials.

The potentially significant project-specific and cumulative adverse air quality impacts associated with increased emissions of air contaminants (e.g., criteria air pollutants, GHGs, and TACs) during the construction and operation phases of the proposed project have been evaluated in this Program EIR. Potential adverse health impacts to sensitive receptors have also been analyzed in this Program EIR. Potential construction and operational air quality impacts associated with the 2016 AQMP control measure areas are provided in this subchapter.

This subchapter identifies and quantifies direct air quality effects, that is, emission reductions anticipated to occur as a result of implementing the various control measures. This subchapter also examines indirect or air quality impacts, that is, potential air pollutant emission increases that could occur as a consequence of efforts to improve air quality (e.g., emissions from control equipment such as afterburners). The analysis is divided in to the following sections: 2016 AQMP Control Measures with Air Quality Impacts, Future Air Quality Emission Inventories, 2016 AQMP Air Quality Modeling Results, Significance Criteria, Future Air Quality Emission Inventories, 2016 AQMP Air Quality Modeling Results, Impact Analysis, Mitigation Measures, and Impacts After Mitigation.

4.1.2 2016 AQMP CONTROL MEASURES WITH POTENTIAL AIR QUALITY AND GREENHOUSE GAS IMPACTS

The air quality impact analysis in this Program EIR identifies the net effect on air quality from implementing the 2016 AQMP. All control measures were analyzed to identify the potentially adverse impacts. Evaluation of control measures was based on examination of the impacts of each of the control measures and technologies focusing on all potential air quality impacts. Table 4.1-1 contains a summary of the 2016 AQMP control measures which may result in the use of compliance options that could generate significant air quality impacts. Table 4.1-4 contains a summary of control measures that could generate significant greenhouse gas impacts

TABLE 4.1-1

Control Measures with Potential Air Quality Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	AIR QUALITY IMPACT
ECC-03	Additional Enhancement in Reducing Existing Residential Building Energy Use (NOx, VOC)	Measure consists of incentives and promoting existing energy efficiency programs that would reduce criteria and GHG emissions.	Potential air quality impacts associated with construction activities.
ECC-04	Reduced Ozone Formation and Emission Reductions from Cool Roof Technology	Take credit for NOx and VOC emissions reductions which would occur due to compliance with required energy efficiency mandates and state regulations.	Potential air quality impacts associated with construction activities.
CMB-01	Transition to Zero- and Near-Zero Emission Technologies for Stationary Sources (NOx, VOC)	Incentivize transition to zero and near-zero emission technologies, specifically those in non-power plant combustion sources.	Potential for emissions as a result of construction activities to replace or retrofit older high emitting equipment (e.g., ICEs) with zero and near zero equipment and potential air quality and GHG emissions from increased electricity demand during operation.
CMB-02	Emission Reductions from Commercial and Residential Space and Water Heating (NOx)	Installation of new commercial space heating furnaces boilers, water heaters, and space heating furnaces.	Potential for emissions as a result of construction activities to replace or retrofit older high emitting equipment.
CMB-03	Emission Reductions from Non-Refinery Flares (NOx, VOC)	Installation of newer flares implementing the best available control technology.	Potential emissions as a result of construction activities needed to replace old flares.
CMB-05	Further NOx Reductions from RECLAIM Assessment (NOx)	Re-examination of the RECLAIM program, including voluntary opt-out and the implementation of additional control equipment and SCR/SNCR equipment.	Potential emissions as a result of construction to install new equipment, generation of ammonia emissions from the operation of SCR/SNCR equipment, and potential air quality and GHG emissions from electricity to operate additional equipment.

TABLE 4.1-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	AIR QUALITY IMPACT
CTS-01	Further Emission Reductions from Coatings, Solvents, Adhesives, and Sealants (VOC)	Reformulation of coatings using different solvents, adhesives, and sealants.	New product reformulations could benefit from reductions in VOC emissions, but may contain toxic materials which could generate adverse emissions.
FLX-02	Stationary Source VOC Incentives (VOC)	Use of replacement coatings, such as UV cured resins and coatings, super-compliant/ultra-low emission technologies and electrification in the place of combustion-based equipment.	Potential construction emissions as a result of replacing old equipment with new coatings/methods (UV/EB/LED) or reformulate with potential toxic materials. Potential air quality and GHG emissions if electricity is needed.
BCM-01	Further Emissions Reductions from Commercial Cooking (PM)	Installation of control equipment such as ESPs, filters, centrifugal separators, and misters.	Potential construction emissions from installation activities and potential air quality and GHG emissions from electricity to operate additional equipment.
BCM-02	Emission Reductions from Cooling Towers (PM)	Installation of drift elimination technologies into cooling towers.	Potential construction emissions from installing new or modifying existing control equipment.
BCM-04	Emission Reductions from Manure Management Strategies (NH3)	Acidifier application, manure removal, manure slurry injection, and dietary manipulation and feed additives to reduce ammonia in manure.	Potential air quality and GHG emissions from poultry and dairy manure thermal gasification.
BCM-05	Ammonia Emission Reduction from NOx Controls (NH3)	Installation and use of advanced catalyst technology for the conversion of ammonia.	Potential emissions from construction activities associated with installing equipment.
BCM-06	Emission Reductions from Abrasive Blasting Operations (PM)	Construction of portable, permanent or temporary enclosures with in-building abrasive blasting activities vented to fume extractors, and dust collectors with HEPA filters and the use of negative air machines.	Potential emissions from construction activities associated with installing control equipment and/or constructing outdoor workspaces and potential air quality and GHG emissions from additional electricity use.
BCM-07	Emission Reductions from Stone Grinding, Cutting, and Polishing Operations (PM)	Installation of engineering controls, such as exhaust ventilation with dust collectors, the use of wet methods like wet-wiping or wet sweeping, and vacuuming with a HEPA filter.	Potential emissions as a result of construction activities to install engineering controls and potential air quality and GHG emissions from additional electricity use.
BCM-08	Further Emission Reductions from Agricultural, Prescribed, and Training Burning (PM)	Incentivize chipping/grinding or composting in the place of agricultural burning as well as the increased utilization of clean fuels for training burns.	Potential emissions from chipping/grinding activities as well as potential pollution from training burns using clean fuels.

TABLE 4.1-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	AIR QUALITY IMPACT
BCM-09	Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves (PM)	Incentivize upgrades of wood burning hearths to cleaner hearths and increase the stringency of the curtailment program and education.	Potential emissions from construction activities to change wood burning hearths to cleaner hearths.
BCM-10	Emission Reductions from Greenwaste Composting (NH3, VOC)	Use of control such as anaerobic digestion and organic processing technology and restrictions for direct applications of un-composted waste to public lands.	Potential emissions from construction and from energy use for anaerobic digestion.
MOB-01	Emission Reductions at Commercial Marine Ports (NOx, SOx, PM)	Financial incentives for cleaner vessels, vehicles, and equipment to use alternative fuels or fuel additives.	Potential emissions from construction activities to install new equipment and potential air quality and GHG emissions from the use of additional electricity and alternative fuels.
MOB-02	Emission Reductions at Rail Yards and Intermodal Facilities (NOx, PM)	Accelerate the penetration of zero and near-zero emission locomotives and the use of alternative fuels and fuel additives.	Potential air quality and GHG emissions from the use of additional electricity, alternative fuels, and fuel additives.
MOB-03	Emission Reductions at Warehouse Distribution Centers (all pollutants)	Use of incentives, regulatory rules, and promotion of hybrid technologies to increase zero and near-zero emission equipment in/around warehouses.	Potential air quality and GHG emissions from the use of additional electricity and alternative fuels.
MOB-04	Emission Reductions at Commercial Airports (all pollutants)	Incentivize zero and near-zero technologies like alternative fuels, diesel PM filters, and low-emitting engines.	Potential air quality and GHG emissions from the use of additional electricity and alternative fuels.
MOB-05	Accelerated Penetration of Partial-Zero Emission and Zero Emissions Vehicles (VOC, NOx, CO)	Incentivize the “Clean Vehicle Rebate Project” to promote use of vehicles with zero and near-zero emissions.	Potential air quality and GHG emissions from the use of additional electricity and alternative fuels.
MOB-07	Accelerated Penetration of Partial Zero and Zero Emission Light Heavy and Medium Heavy Duty Vehicles (NOx, PM)	Accelerate the penetration of zero and near-zero emission vehicles and the use of alternative fuels and fuel additives.	Potential air quality and GHG emissions from the use of additional electricity, alternative fuels, and fuel additives.
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program (NOx, PM)	Incentivize the use of zero emission technologies and the building of electric or magnetic power into roadway infrastructure to reduce emissions.	Potential emissions from construction activities and from the additional use of electricity use and alternative fuels.
MOB-10	Extension of the SOON Provision for Construction/Industrial Equipment (NOx)	Incentivize the SOON program and phasing-in vehicles that meet Tier 4 standards in place of older, high-emitting equipment.	Potential emissions from the use of alternative fuels.

TABLE 4.1-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	AIR QUALITY IMPACT
MOB-13	Off-Road Mobile Source Emission Reduction Credit Generation Program (NOx, SOx, PM)	Accelerate the penetration of zero and near-zero off-road mobile sources and the use of alternative fuels and fuel additives.	Potential air quality and GHG emissions from the use of additional electricity, alternative fuels, and fuel additives.
MOB-14	Emissions Reductions from Incentive Programs (NOx)	Implementation of the Prop 1B and Carl Moyer Programs to accelerate the penetration of clean air vehicles.	Potential emissions from construction activities.
EGM-01	Emission Reductions from New Development or Redevelopment Projects (all pollutants)	Accelerate the penetration of zero and near-zero emission technologies in new or redevelopment projects, and the use of things like dust control, alternative fuels, diesel PM filter, low-emitting engines, low VOC materials and mitigation fees.	Potential air quality and GHG emissions from the additional use of electricity and alternative fuels.
TXM-01	Control of Metal Particulate from Metal Grinding Operations (TACs, PM)	Construction of enclosures and control equipment such as exhaust ventilation with dust collectors, use of wet methods like wet-wiping or wet sweeping to prevent dust release and other measures like vacuuming with a HEPA filter.	Potential emissions from construction and operation of enclosures and control equipment, and air quality and GHG emissions from additional electricity use.
TXM-02	Control of Toxic Metal Particulate Emissions from Plating and Anodizing Operations (TACs, PM)	Modification of existing equipment, construction of enclosures and control equipment, such as exhaust ventilation with dust collectors, and the implementation of new measures like vacuuming with a HEPA filter and wet-wiping to prevent dust emission.	Potential emissions from construction and operation of enclosures and control equipment, and air quality and GHG emissions from additional electricity use.
TXM-04	Control of Toxic Metal Particulate Emissions from Soil Decontamination (TACs, PM)	Construction and operation of chemical treatment, barriers, tire and wheel knockout and cleaning stations, and other dust suppression techniques.	Potential emissions from construction activities to construct dust control equipment.
TXM-05	Control of Toxic Metal Particulate Emissions from Laser Plasma Cutting (TACs, PM)	Construction of enclosures and control equipment, such as HEPA filters.	Potential emissions from construction and operation of enclosures and control equipment and air quality and GHG emissions from additional electricity use.

TABLE 4.1-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	AIR QUALITY IMPACT
TXM-06	Control of Toxic Emissions from Metal Melting Facilities (TACs, PM)	Construction of enclosures and control equipment, such as exhaust ventilation with filters/baghouses, and the implementation of methods to prevent dust release including wet-wiping and vacuuming with HEPA filters.	Potential emissions from construction and operation of enclosures and control equipment and air quality and GHG emissions from additional electricity use.
TXM-07	Control of Lead Emissions from Stationary Sources (TACs, PM)	Construction and implementation of control equipment, including baghouses and HEPA filters and the use of best management practices, to minimize lead emissions.	Potential emissions from construction and operation of enclosures and control equipment and air quality and GHG emissions from additional electricity use.
TXM-08	Control of Emissions from Chemical Stripping of Cured Coatings (Methylene Chloride)	Reformulation of solvents and use of activated carbon in carbon adsorbers.	Potential emissions from reformulated solvents and air quality and GHG emissions from additional electricity use.
TXM-09	Control of Toxic Emissions from Oil and Gas Productions (TACs, PM)	Construction of enclosures and control equipment and implementation of methods to prevent dust release such as wet-wiping and vacuuming with a HEPA filter.	Potential emissions from construction and operation of enclosures and control equipment and air quality and GHG emissions from additional electricity use.
ORLD-01	Advanced Clean Cars 2 (NOx, ROG)	Expand and/or set new standards for clean cars to increase zero and near-zero emission vehicles which could include the use of alternative fuels.	Potential air quality and GHG emissions from the use of additional electricity and alternative fuels.
ORLD-03	Further Deployment of Cleaner Technology: On-Road Light-Duty Vehicles (NOx, ROG)	Accelerate the penetration of zero and near-zero emission vehicles, including those vehicles that use alternative fuels and fuel additives.	Potential air quality and GHG emissions from the use of additional electricity and alternative fuels.
ORHD-02	Low-NOx Engine Standards (NOx	Implementation of technologies to reduce emissions from heavy duty engines including the use of alternative fuels and fuel additives.	Potential air quality and GHG emissions from the use of additional electricity and alternative fuels.
ORHD-04	Advanced Clean Transit (NOx, ROG)	Implementation of technologies to accelerate the penetration of zero and near-zero emission buses into the fleet, including the use of alternative fuels.	Potential air quality and GHG emissions from the use of additional electricity and alternative fuels.

TABLE 4.1-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	AIR QUALITY IMPACT
ORHD-05	Last Mile Delivery (NOx, ROG)	Accelerate the penetration of zero and near-zero emission last mile delivery trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential emissions from additional electricity use, the use of alternative fuels, and the construction of new roadway infrastructure.
ORHD-06	Innovative Technology Certification Flexibility (NOx)	Accelerate the penetration of zero and near-zero emission heavy duty trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential emissions from additional electricity use, the use of alternative fuels, and the construction of new roadway infrastructure.
ORHD-07	Zero Emission Airport Shuttle Buses (NOx, ROG, PM2.5)	Implementation of technologies to accelerate the penetration of zero and near-zero emission airport shuttles, including the use of alternative fuels.	Potential air quality and GHG emissions from the use of additional electricity and alternative fuels.
ORHD-08	Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Accelerate the penetration of zero and near-zero emission heavy duty vehicle engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential emissions from additional electricity use, the use of alternative fuels, and the construction of new roadway infrastructure.
ORHD-09	Further Development of Cleaner Technology: On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Accelerate the penetration of zero and near-zero emission engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential emissions from additional electricity use, the use of alternative fuels, and the construction of new roadway infrastructure.
ORFIS-01	More Stringent National Locomotive Standards (NOx, ROG)	Use of Tier 5 control equipment such as SCRs, alternative fuels, DPM filters and electric batteries.	Potential emissions from the installation and use of Tier 5 control equipment; and the use of alternative fuels.
ORFIS-03	Incentivize Low Emission Efficient Ship Visits (NOx, PM)	Incentivize the use of control equipment such as SCRs.	Potential emissions from the generation of ammonia emissions from the use of SCR equipment and potential air quality and GHG emissions from electricity needed to operate additional equipment.
ORFIS-04	At-Berth Regulation Amendments (NOx, ROG)	Further reduce emissions from ships at berth and advance the use of near-zero and zero emission technologies	Potential air quality impacts from construction activities and increased electricity generation.

TABLE 4.1-1 (concluded)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	AIR QUALITY IMPACT
ORFIS-05	Further Development of Cleaner Technology: Off-Road Federal and International Sources (NOx, ROG)	Accelerate deployment of cleaner marine, rail and aircraft off-road technology by increasing incentive program.	Potential air quality impacts from construction activities, increased electricity generation, and the use of alternative fuels.
OFFS-01	Zero-Emission Off-Road Forklift Regulation Phase 1 (NOx, ROG)	Accelerate the penetration of zero emission technologies to be used in off-road forklifts.	Potential air quality impacts from construction activities and increased electricity generation.
OFFS-04	Zero-Emission Airport Ground Support Equipment (NOx, ROG, PM2.5)	Accelerate the penetration of zero emission technologies to be used in airport ground support equipment.	Potential air quality impacts from construction activities, from increased electricity generation, and the use of alternative fuels.
OFFS-05	Small Off-Road Engines (NOx, ROG)	Accelerate the penetration of zero emission technologies to be used in small off-road engines.	Potential air quality impacts from construction activities and increased electricity generation.
OFFS-06	Transport Refrigeration Units Used For Cold Storage (NOx, ROG, GHG)	Accelerate penetration of zero emission technologies in cold store refrigeration unites.	Potential air quality impacts from construction activities and increased electricity generation.
OFFS-07	Low Emission Diesel Requirement (NOx, PM)	Reformulation of diesel fuel to achieve lower emissions.	Potential air quality impacts from construction activities at refineries, increased electricity generation, and the use of alternative fuels.
OFFS-08	Further Deployment of Cleaner Technologies: Off-Road Equipment (NOx, ROG, PM2.5)	Accelerate the implementation of zero emission technologies in off-road equipment.	Potential air quality impacts from construction activities, increased electricity generation, and the use of alternative fuels.
CPP-01	Consumer Products Program (ROG)	Reformulation of consumer products.	New product formulations could potentially generate increased toxic emissions.

4.1.3 SIGNIFICANCE CRITERIA

The NOP/IS concluded that the 2016 AQMP would not conflict with or obstruct implementation of the applicable air quality plan, create objectionable odors affecting a substantial number of people, diminish an existing air quality rule or future compliance requirement resulting in a significant increase in air pollutant(s), or conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

A threshold of significance is an identifiable quantitative, qualitative, or performance level of a particular environmental effect. Proposed projects that do not exceed the significance threshold for the effect under evaluation normally will be determined to be less than significant. Exceeding any significance threshold means the effect will normally be determined to be significant by the lead agency (CEQA Guidelines Section 15064(a)). To determine whether or not air quality impacts from the proposed project are significant, impacts will be evaluated and compared to the significance criteria in Table 4.1-2. If impacts equal or exceed any of the criteria in Table 4.1-2, they will be considered significant.

TABLE 4.1-2

Air Quality Significance Thresholds

Mass Daily Thresholds[a]		
Pollutant	**Construction[b]**	**Operation[c]**
NO_x	100 lb/day	55 lb/day
VOC	75 lb/day	55 lb/day
PM10	150 lb/day	150 lb/day
PM2.5	55 lb/day	55 lb/day
SOx	150 lb/day	150 lb/day
CO	550 lb/day	550 lb/day
Lead	3 lb/day	3 lb/day
Toxic Air Contaminants, Odor, and GHG Thresholds		
TACs (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk ≥ 10 in 1 million Chronic and Acute Hazard Index ≥ 1.0 (project increment) Cancer Burden ≥ 0.5 excess cancer cases (in areas ≥ 1 in 1 million)	
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402	
GHG	10,000MT/yr CO_2eq for industrial facilities	
Ambient Air Quality for Criteria Pollutants[d]		
NO_2 1-hour average annual average	In attainment; significant if project causes or contributes to an exceedance of any standard: 0.18 ppm (state) and 0.100 (federal)[e] 0.03 ppm (state) and 0.0534 ppm (federal)	
PM10 24-hour annual average	10.4 μg/m^3 (construction)[f] and 2.5 μg/m^3 (operation) 1.0 μg/m^3	
PM2.5 24-hour average	10.4 μg/m^3 (construction)[f] and 2.5 μg/m^3 (operation)	
SO_2 1-hour average 24-hour average	0.255 ppm (state) and 0.075 ppm (federal – 99^{th} percentile) 0.04 ppm (state)	
Sulfate 24-hour average	25 μg/m^3 (state)	
CO 1-hour average 8-hour average	In attainment; significant if project causes or contributes to an exceedance of any standard: 20 ppm (state) and 35 ppm (federal) 9.0 ppm (state/federal)	
Lead 30-day average Rolling 3-month average	1.5 μg/m^3 (state) 0.15μg/m^3 (federal)	

a) Source: SCAQMD CEQA Handbook (SCAQMD, 1993)
b) Construction thresholds apply to both the SCAB and Coachella Valley (Salton Sea and Mojave Desert Air Basin)
c) For Coachella Valley, the mass daily thresholds for operation are the same as the construction thresholds.
d) Ambient air quality thresholds for criteria pollutants based on SCAQMD Rule 1303, Table A-2 unless otherwise stated.
e) The federal threshold has not been adopted for general use yet by SCAQMD, but as it is a federal requirement for permits being issued for this project.
f) Ambient air quality threshold based on SCAQMD Rule 403.

KEY: ppm = parts per million; μg/m^3 = microgram per cubic meter; lb/day = pounds per day; MT/yr CO2eq = metric tons per year of CO_2 equivalents, ≥ greater than or equal to, > = greater than

4.1.4 FUTURE AIR QUALITY EMISSION INVENTORIES

It should be noted that 2012 is the baseline year used for the emissions inventory to develop the control strategy and future baseline emissions in the 2016 AQMP. However, the latest verifiable air quality data (from approved monitoring stations) are from 2015, which can be found in Chapter 2 of the 2016 AQMP and Chapter 3 of the ~~Draft~~Final Program EIR. The most recent environmental topic data is from 2016 and was used for the CEQA baseline in determining environmental impacts because that was the time of the release of the NOP/IS, in accordance with CEQA requirements.

Figures 4.2-1 and 4.2-2 show 2012 and 2013 emission inventories, respectively, by major source categories. These figures are included here to show projected air quality trends through 2031. Baseline emissions for major source categories (i.e., point, area, on-road, and off-road) in 2012 are provided in Figure 4.1-1. Figure 4.1-2 shows the projected future 2031 emission inventory that would be expected if no new AQMP control measures are subsequently promulgated as rules. It does, however, take into account emission reductions anticipated to be achieved for existing rules with future compliance dates.

A comparison of Figures 4.1-1 and 4.1-2 indicates that the on-road mobile category continues to be a major contributor to CO and NOx emissions. However, because implementation of most of the mobile source rules and regulations will occur by 2023, the contribution of on-road mobile sources by 2031 account for much less of the VOC, NOx, and CO emissions as compared to 2012, as follows: about 14 percent of total VOC emissions compared to 33 percent in 2012; about 30 percent of total NOx emissions compared to 56 percent in 2012; and about 26 percent of total CO emissions compared to 63 percent in 2012. For directly emitted PM2.5 emissions, mobile sources will represent 23 percent of the emissions with another 14 percent attributable to vehicle-related entrained road dust and a reduction from the mobile source contribution in the base year. Stationary sources are projected to emit the majority of the SOx emissions from the point source category, contributing 57 percent of the SOx emissions in the Basin. In 2031, area sources will play even a larger role in VOC emissions, emitting more than point sources and mobile sources combined. Area sources will become the major contributor to VOC emissions from 37 percent in 2012 to 54 percent in 2031 and are projected to remain the predominant source of directly emitted PM2.5 emissions (49 percent).

FIGURE 4.1-1 (REVISED)
CONTRIBUTION BY SOURCE CATEGORY TO 2012 EMISSION INVENTORY.
(VOC & NOX – SUMMER PLANNING; CO, SOX, & PM2.5 – ANNUAL AVERAGE)

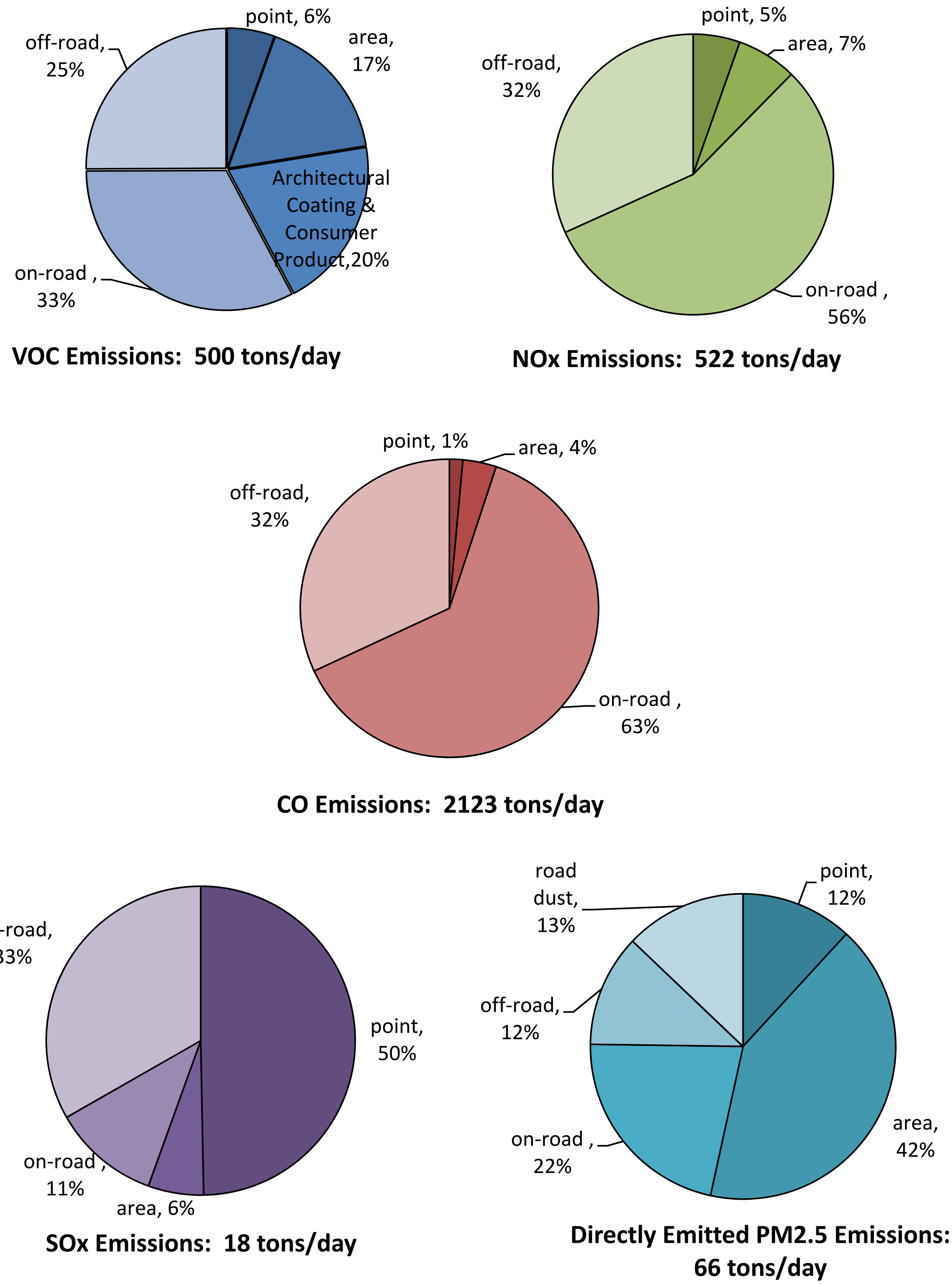
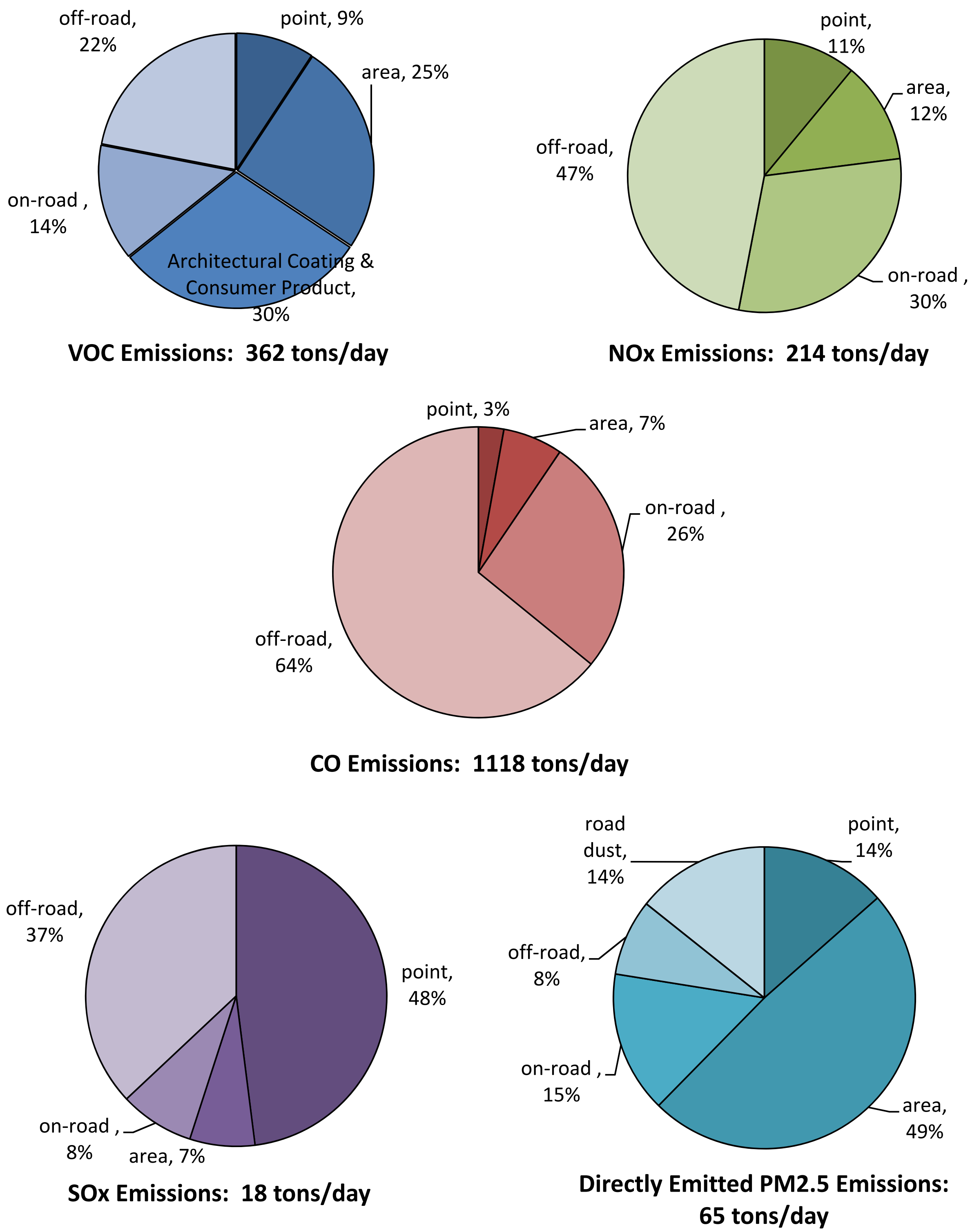


FIGURE 4.1-2 <u>(REVISED)</u>
CONTRIBUTION BY SOURCE CATEGORY TO 2031 EMISSION INVENTORY.
(VOC & NOX – SUMMER PLANNING; CO, SOX, & PM2.5 – ANNUAL AVERAGE)



4.1.5 2016 AQMP AIR QUALITY MODELING RESULTS

The 2016 AQMP ozone and PM2.5 attainment demonstration has been developed using the U.S. EPA- supported Community Multiscale Air Quality (CMAQ) (version 5.0.2) modeling platform with SAPRC07 chemistry, and the Weather Research and Forecasting Model (WRF) (version 3.6) meteorological fields. PM2.5 and ozone were modeled simultaneously using the one-atmosphere modeling platform. Ozone attainment demonstrations focused on the period from May through September, while PM2.5 was analyzed for the entire year. The simulations were conducted over an area with a western boundary over 100 miles west of the Ports of Los Angeles and Long Beach. The eastern boundary extends slightly beyond the Colorado River while the northern and southern boundaries of the domain extend to the San Joaquin Valley and the Northern portions of Mexico, respectively. CMAQ was simulated with a 4-kilometer grid resolution.

For the 2016 AQMP, WRF was updated with the most recent version (version 3.6.1) available at the time of protocol preparation and was evaluated with a set of input data, which includes land-use classification and sea-surface temperature initialization fields. The WRF simulations were initialized from National Centers for Environmental Prediction (NCEP) analyses and run for 3-day increments with four-dimensional data assimilation (FDDA).

Day-specific point source emissions were extracted from the SCAQMD stationary source and RECLAIM inventories. Mobile source emissions included day and hour real-time profiles based on the CALTRANS Performance Measurement System and weight-in-motion profiles, CARB's EMFAC2014 emissions model, and vehicle population data and transportation analysis zone (TAZ) data provided by SCAG. The mobile source data and selected area source data were subjected to daily WRF-derived temperature corrections to account for enhanced evaporative emissions on warmer days. Gridded daily biogenic VOC emissions were provided by CARB using the MEGAN biogenic emissions model. The simulations benefited from enhancements made to the emissions inventory, such as day-specific adjustments in traffic volumes when generating on-road emissions and improvements in gridding surrogates for spatial allocations of area and off-road emissions.

Detailed information on the modeling approach, data retrieval, model development and enhancement, model application, emissions inventory development, and interpretation of results is presented in Chapter 5 of the 2016 AQMP. The following sections summarize the results of the 8-hour/1-hour ozone and annual/24-hour PM2.5 attainment demonstration modeling efforts and provide an update to the future projected ozone and PM2.5 levels given new emissions estimates, the latest air quality measurements, and modeling tools.

4.1.5.1 PM2.5 Air Quality

Within the Basin, PM2.5 particles are either directly emitted into the atmosphere (primary particles), or are formed through atmospheric chemical reactions from precursor gases (secondary particles). Primary PM2.5 includes road dust, diesel soot, combustion products, and other sources of fine particles. Secondary products, such as sulfates, nitrates, and complex carbon compounds are formed from reactions with oxides of sulfur, oxides of nitrogen, VOCs, and ammonia.

PM2.5 speciation data measured at four sites during 2012 provided the chemical characterization for evaluation and validation of the CMAQ model predictions. With one site in each county, the four sites are strategically located to represent aerosol characteristics in the four counties in the Basin. Riverside-Rubidoux was traditionally the Basin's maximum location. Fontana and Anaheim experience high concentrations within their respective counties, and the Central Los Angeles site was intended to capture the characteristics of an emission source area. The close proximity of Mira Loma to Rubidoux combined with the common in-Basin air flow and transport patterns enable the use of the Rubidoux speciated data as being representative of the particulate speciation at Mira Loma. Both sites are located directly downwind of the dairy production areas in Chino and the warehouse distribution centers in the northwestern corner of Riverside County. Speciated data were monitored at the selected sites for MATES IV during the period from June 2012 to June 2013, and were analyzed to corroborate the applicability of using the 2012 chemical profiles.

Model performance was evaluated against concentrations of ammonium, nitrates, sulfates, secondary organic matter, elemental carbon, primary, and total mass of PM2.5 measured at the four monitoring sites (Rubidoux, Central Los Angeles, Anaheim, and Fontana).

The federal annual PM2.5 standards are predicted to be achieved in 2023 due to the implementation of the proposed ozone strategy. However, the federal CAA does not allow 182(e)(5) measures in the attainment demonstration of PM2.5; therefore, an additional scenario using only non-182(e)(5) measures was developed for 2025 in order to comply with the CAA requirements. With only the non-182(e)(5) measure reductions, the annual PM2.5 standard is expected to be met in 2025. The California annual PM2.5 standard will be achieved in 2025 under this scenario.

4.1.5.2 Ozone Air Quality

The set of 153 days from May 1, 2012 through September 30, 2012 was analyzed to determine the 8-hour maximum ozone for the base year 2012 and future attainment years of 2023 and 2031—the attainment years for the 1997 standard of 80 ppb and the 2008 standard of 75 ppb, respectively. Both baseline and controlled cases were simulated. The former represents the level of emissions with no additional reductions beyond existing measures, and the latter contains additional emission reductions proposed in the 2016 AQMP to reach attainment.

Finally, a set of simulations with incremental VOC and NOx emission reductions from 2023 and 2031 baseline emissions were generated to create ozone isopleths for each station in the Basin. The ozone isopleths provide guidance in developing control strategies by depicting ozone concentrations as a function of both NOx and VOC reductions. They provide the basis for estimating the Basin carrying capacity, e.g., the maximum allowable emissions of NOx and VOC that can occur while still being able to reach attainment.

The 2016 AQMP baseline ozone simulations reflect the changes made to the 2023 and 2031 baseline inventories. The 2016 AQMP summer planning inventory for 2023 has a similar VOC-to-NOx emissions ratio (1.35 vs. 1.37) as the 2012 AQMP, although the total tonnages of both precursor emissions are lower than those presented in the 2012 AQMP. Lower 2023 baseline VOC and NOx emissions in the 2016 AQMP relative to the 2012 AQMP reflect the impact of the recession occurring between 2008 and 2010. The 2012 AQMP, for which the base year was 2008, did not fully capture the duration of the economic downturn and over-estimated near-term growth. The new 2016 AQMP inventory has been revised to properly account for these circumstances. With the controls proposed in the 2016 AQMP, the future year ozone concentrations are expected to meet the federal standards.

The carrying capacities, the maximum allowable NOx emissions that can occur while still being able to meet the ozone standards, are estimated to be 150 tons/day NOx in 2023, and 100 tons/day NOx in 2031. NOx reductions of approximately 43 percent and 55 percent from the baseline levels are needed in 2023 and 2031, respectively. Approximately 16 percent of NOx reductions from the 2012 baseline are needed to meet the 1-hour ozone standard by 2022, confirming that the 8-hour standard is more stringent than the 1-hour standard. The strategies developed for attainment of the 2023 and 2031 8-hour standards will ensure attainment of the 1-hour standard by 2022.

The California standard for 8-hour ozone is 70 ppb, the same level as the 2015 revised federal standard, but this state standard will not be achieved by 2031. Preliminary analysis suggests additional emission reductions beyond the level required in 2031 will be needed in order to meet the 70 ppb standard.

4.1.6 IMPACT ANALYSIS

Air quality impacts are potential increases in air pollutants that can occur directly or indirectly from implementing the control measures in the 2016 AQMP. SCAQMD staff evaluated all 2016 AQMP control measures to identify those control measures that have the potential to generate adverse air quality impacts.

It is expected that many 2016 AQMP control measures will be either incentivized or promulgated as rules, laws, or ordinances by state (California), regional (SCAQMD, special districts, and counties), and local (cities) agencies. Because requirements in rules, laws, and ordinances can be enforced by the adopting agency, maximizing potential impacts has been determined to be the most appropriate, conservative approach needed in order to properly analyze and disclose the potential air quality impacts in this Program EIR. A number of control measures, however, involve incentives or voluntary compliance in order to achieve emission reductions. Since these types of control measures are not enforceable because they do not involve the adoption of a rule, law or ordinance by applicable agencies, the magnitude of impacts is uncertain. To further provide a conservative analysis of potential air quality impacts from adopting and implementing the 2016 AQMP, the incentive or voluntary control measures will be considered in the same manner as control measures that are expected to be adopted by applicable agencies in order to maximize the potential impacts from these control measures.

Table 4.1-1 identifies only those control measures that have the potential to generate air quality impacts and the types of air quality impacts for each control measure. Therefore, the analyses of air quality impacts in the following subsections are based on the evaluation of control measures identified in Table 4.1-1.

4.1.6.1 Criteria Pollutants – Construction Activities

While implementing the 2016 AQMP control measures, operational emissions are expected to be reduced while construction-related activities associated with installing or replacing equipment, for example, are expected to generate emissions from construction worker vehicles, transport trucks, and construction equipment. Implementing some of the measures in the 2016 AQMP would require constructing the following categories of new infrastructure including: 1) the demolition or removal of an existing envelope (existing building components or structures), mechanical systems, and/or water heating systems, and the construction or replacement with new energy efficient structures, mechanical systems, and/or water heating systems; 2) the construction of additional infrastructure to support alternative-fueled vehicles (electric, hydrogen, natural gas) and the electrification of new sources (e.g., additional on-road vehicles and marine vessels, "wayside" electric or magnetic power such as catenary lines); and 3) the construction of control equipment at stationary sources (e.g., SCRs, SNCRs particulate controls, and vapor recovery systems) or the use of cleaner stationary sources (e.g. Tier 4 engines and newer boilers). The following paragraphs identify the 2016 AQMP control measures that have the potential to generate construction emissions described in the aforementioned categories.

Control measures in the 2016 AQMP that have the potential to generate construction impacts from the demolition or removal of an existing envelope (existing building components or structures), mechanical systems, and/or water heating systems and constructing or replacing these with new energy efficient structures, mechanical systems, and/or water heating systems include the following: ECC-03 and ECC-04.

Control measures in the 2016 AQMP that have the potential to generate construction emission impacts from constructing infrastructure to provide support for new cleaner equipment or vehicles include the following: MOB-01, MOB-02, MOB-03, MOB-04, MOB-05, MOB-07, MOB-10, MOB-13, MOB-14, ORHD-05, ORHD-08, ORHD-09, ORFIS-04, ORFIS-05, OFFS-01, OFFS-04, OFFS-05, OFFS-06, OFFS-07, and OFFS-08.

Control measures in the 2016 AQMP that may require construction activities in connection with the construction of control equipment at stationary sources or cleaner stationary sources (e.g., SCRs, SNCRs, particulate controls, and vapor recovery systems) include the following: CMB-01, CMB-02, CMB-03, CMB-05, FLX-02, BCM-01, BCM-02, BCM-05, BCM-06, BCM-07, BCM-09, BCM-10, TXM-01, TXM-02, TXM-04, TXM-05, TXM-06, TXM-07, and TXM-09.

In addition to control measures designed to bring the Basin into attainment with all AAQSs, the 2016 AQMP includes baseline and future regional emission inventories for all quantifiable emissions sources in the Basin (see 2016 AQMP Appendix IV-A). The baseline and future emission inventories in Appendix IV-A include the construction and demolition category, which is primarily related to dust generating activities such as trenching, grading, loading, etc. To capture emissions from construction equipment, Appendix III also includes baseline and future inventories for off-road equipment. The analysis of construction air quality impacts from implementing the 2016 AQMP control measures assumes that all off-road equipment is comprised of construction equipment. The analysis of construction emission impacts from implementing 2016 AQMP control measures also assumes that those control measures previously discussed and listed in Table 4.1-1 as having the potential to generate construction emissions will contribute to future regional construction and demolition emission inventories. The exact scope of the construction activities necessary to implement the proposed control measures is not known at this time. However, the control measures required to implement the 2016 AQMP are similarly crafted to some control measures which have been implemented at facilities due to SCAQMD rulemaking.

The typical construction scenario of an air pollution control device at an existing facility consists of the following phases and associated on-road and off-road construction equipment:

- Grading/Site Preparation: Rubber Tired Dozers, Tractors/Loaders/Backhoes, Construction Workers' Vehicles, and Medium Duty Trucks
- Paving: Pavers, Cement/Mortar Mixers, Rollers, Construction Workers' Vehicles, and Medium Duty Trucks
- Installing/Constructing Air Pollution Control Device(s): Cranes, Forklifts, Tractors/Loaders/Backhoes, Construction Workers' Vehicles, and Medium Duty Trucks

Construction emissions were estimated for these various construction phases associated with the installation of air pollution control devices[1]. In addition, criteria pollutant emissions were calculated for all on-road vehicles transporting workers, vendors, and material removal and delivery. The analysis assumes that each phase must be entirely completed before the next phase can commence such that there would be no overlap of construction phases for the construction of the new control devices. Table 4.1-3 summarizes the construction emissions that would be expected to occur as a result of installing one air pollution control device at one facility. (See Appendix C for detailed assumptions and calculations.) Although the construction emissions at each individual facility might not exceed the SCAQMD's CEQA significance thresholds, it is foreseeable and likely that on any given day, construction of one or more control devices in order to comply with the 2016 AQMP could occur at more than one facility. Based on the results in Table 4.1-3, if more than four facilities or more than four control devices were concurrently constructed on any given day, the emissions would exceed the SCAQMD's air quality significance thresholds. Therefore, construction emissions are considered significant.

[1] In general, no or limited construction emissions from grading are anticipated because modifications or installation of new equipment would occur at existing industrial/commercial facilities and, therefore, would not be expected to require earthmoving, grading, etc.

TABLE 4.1-3

Typical Peak Daily Construction Emissions for Control Devices in the Basin (lbs/day)

Source Category	VOC	NOx	CO	SOx	PM10	PM2.5
Grading/Site Preparation	2.7	25	11	0.0	3.9	1.6
Paving	0.2	12	8	0.01	0.7	0.7
Device Installation	3.4	30	15	0.0	1.4	1.3
Maximum Emissions (1 Facility)	3.4	30	15	0.01	3.9	1.6
Maximum Emissions (4 Facilities)	13.6	120	60	0.04	15.6	6.4
SCAQMD Significance Thresholds	75	100	550	150	150	55
Significant? (YES/NO)	NO	YES	NO	NO	NO	NO

Source: Appendix C
Note: Each construction phase includes emissions from worker vehicles and truck trip deliveries and hauling

The SCAQMD has developed localized significance thresholds for criteria pollutant emissions to determine whether or not a project may generate significant adverse localized air quality impacts. An analysis of localized air quality impacts for criteria pollutant emissions is not applicable to regional projects such as local general plans, specific plans, or AQMPs (SCAQMD, 2008) because the details of the individual projects to implement these types of plans and their locations are not known at this time. Therefore, a localized air quality impact analysis has not been performed for the 2016 AQMP in this Program EIR.

4.1.6.2 Criteria Pollutants – Operational Activities

The federal annual PM2.5 standards are predicted to be achieved by 2023 via the implementation of the proposed ozone strategy. However, the federal CAA does not allow 182(e)(5) measures in the attainment demonstration of PM2.5; therefore, an additional scenario using only non-182(e)(5) measures was developed to comply with the CAA requirements by 2025. With only the non-182(e)(5) measure reductions, the annual PM2.5 standard is expected to be met by 2025. As shown in Figure 4.1-3, the California annual PM2.5 standard is also expected to be achieved by 2025 under this scenario.

The carrying capacities, the maximum allowable NOx emissions that can occur will still being able to meet ozone standards, are estimated to be 150 tons/day NOx in 2023, and 100 tons/day NOx in 2031. NOx reductions of approximately 43 percent and 55 percent from the baseline levels are needed in 2023 and 2031, respectively. Approximately 16 percent of NOx reductions from the 2012 baseline are needed in order to meet the 1-hour ozone standard by 2022, confirming that the 8-hour standard is more stringent than the 1-hour standard. The strategies developed for the attainment of the 2023 and 2031 8-hour standards will ensure attainment of the 1-hour standard by 2022.

The California standard for 8-hour ozone is 70 ppb, the same level as the 2015 revised federal standard, but this state standard will not be achieved by 2031. Preliminary analysis suggests additional emission reductions beyond the level required in 2031 will be needed in order to meet the 70 ppb standard (see Figure 4.1-4).

FIGURE 4.1-3
PROJECTION OF FUTURE ANNUAL PM2.5 CONCENTRATIONS

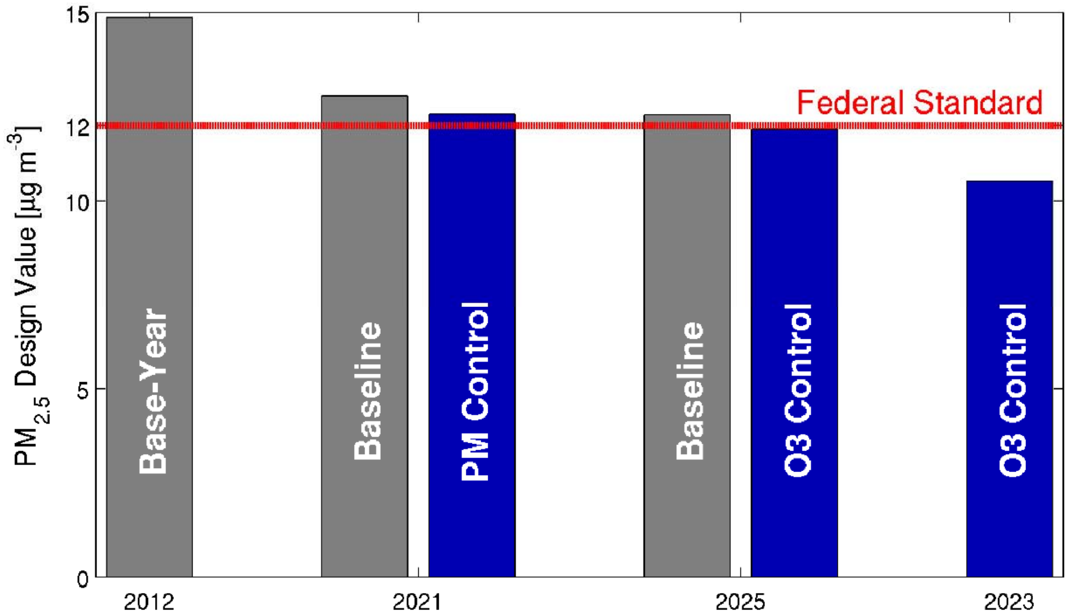
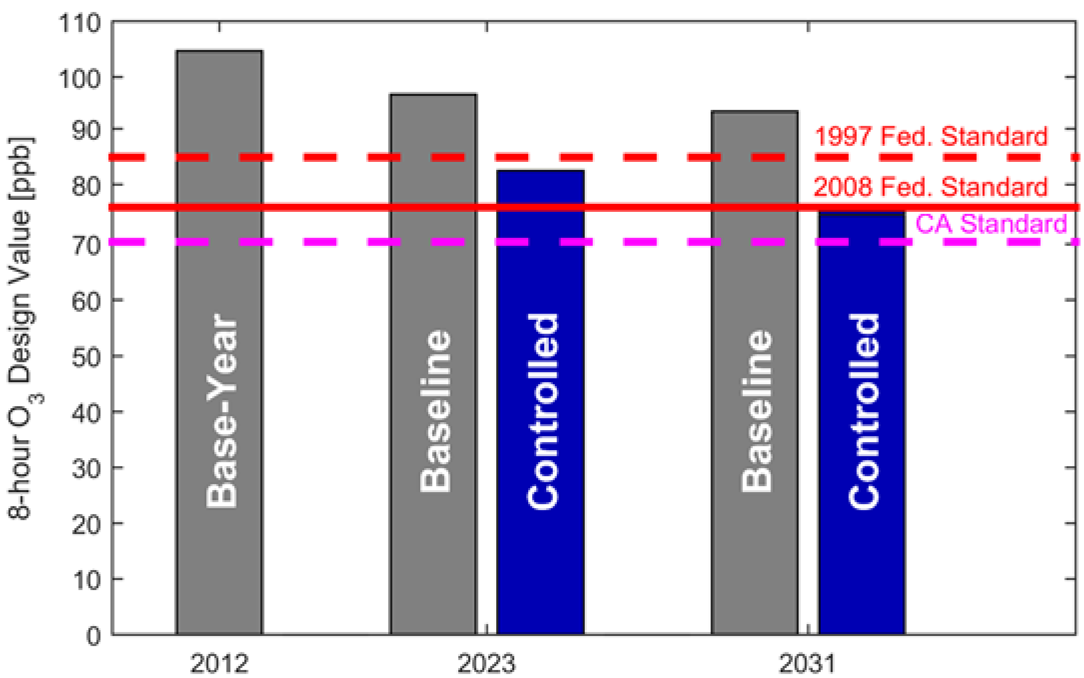


FIGURE 4.1-4
PROJECTION OF FUTURE 8-HOUR OZONE CONCENTRATIONS



4.1.6.2.1 Impacts from Increased Electricity Demand

Implementation of the control measures in the 2016 AQMP is expected to increase the future demand for electricity in two ways. First, electricity is often used as the power source to operate various components of add-on air pollution control equipment and electric construction equipment that may be required, in lieu of diesel- or gasoline-fueled construction equipment, by future rules in order to reduce emissions from the combustion of fuels. Second, a number of 2016 AQMP control measures may increase the future demand for electricity as a result of projected increases in the penetration of electric on-road and off-road vehicles in fleets regulated by the SCAQMD and by replacing existing equipment with zero or near-zero equipment.

Electricity Demand Impacts from Operating Air Pollution Control Equipment

There are a variety of different types of air pollution control equipment that use electricity to reduce criteria pollutant emissions including, but not limited to, the following: electrostatic precipitators (ESPs), ventilation systems, fan motors, vapor recovery systems, SCR, SNCR, etc. As such, an increased demand for electricity may cause electricity providers to increase the generation of power, which in turn could result in increased indirect emissions of criteria pollutants in the Basin and in other portions of California if electricity is imported to the Basin. The stationary source measures that may result in an increased demand for electrical energy due to operation of add-on air pollution control equipment are included in Table 4.1-1 and the types of air pollution control equipment that may increase demand for electricity are described in the following bullet points. Due to a variety of factors such as the number of pieces of equipment, the size of the equipment, and the type of operations, etc., it is difficult to accurately quantify electricity demand impacts. Therefore, the following discussion provides a qualitative analysis of the potential future electricity demand impacts that may be expected to occur from the installation and operation of air pollution control equipment:

- ECC-03 would result in the installation of energy efficient equipment, but there may be an increase in electricity usage from construction.

- CMB-01 would result in the further control of NOx and VOC emissions through either the use of add-on air pollution control technologies or by replacing existing stationary combustion sources (e.g., ICEs and boilers) with zero or near-zero equipment performing the same function, including equipment that is powered by electricity.

- CMB-05 would control NOx emissions from RECLAIM sources which use electricity to operate various components of the equipment.

- BCM-01 would result in the further control of PM emissions from commercial cooking sources by installing air pollution control devices or technologies such as ESPs, filters, centrifugal separators, and misters which typically require electricity to operate.

- BCM-06 would result in the further control of PM emissions from abrasive blasting sources by installing air pollution control devices such as fume extractors, dust collectors with HEPA filters, or negative air machines which typically require electricity to operate.

- BCM-07 would result in the further control of PM emissions from stone grinding and polishing operations by using exhaust ventilation with dust collectors, wet methods like wet-wiping or wet sweeping, or by vacuuming with a HEPA filter which typically require electricity to operate.

- EGM-01 would promote infrastructure in redevelopment projects to accelerate the penetration of zero and near-zero emission technologies which typically require electricity to operate.

- TXM-01 would result in the further control of TAC and PM emissions from metal grinding operations by using cyclones, baghouses, scrubbers, and HEPA filters which typically require electricity to operate.

- TXM-02 would result in the further control of TAC and PM emissions from plating and anodizing operations by using equipment such as scrubbers, mesh pads, and HEPA filters which typically require electricity to operate.

- TXM-05 would result in the further control of TAC and PM emissions from laser plasma cutting operations by using add-on air pollution control equipment such as HEPA filters which typically require electricity to operate.

- TXM-06 would result in the further control of TAC and PM emissions from metal melting facilities by using add-on controls such as HEPA filters and filtered vacuuming which typically require electricity to operate.

- TXM-07 would result in the further control of TAC and PM emissions from stationary sources of lead by using controls such as baghouses and HEPA filters which typically require electricity to operate.

- TXM-08 would result in the further control of TAC emissions (methylene chloride) from chemical stripping operations by using carbon adsorbers which typically require electricity to operate.

- TXM-09 would result in the further control of TAC and PM emissions from oil and gas producing operations by using carbon adsorbers which typically require electricity to operate.

Electricity Demand Impacts from Electric Vehicles

In the past, AQMP control measures that were promulgated as rules or regulations were performance based in that they did not mandate a particular control technology or fuel provided that the emission control requirement or emission standard could be achieved. However, because more stringent emission control regulations are necessary in order to achieve all AAQSs, the reliance on electricity is becoming a more important component to reducing emissions from a variety of economic sectors, especially mobile sources. With regard to some of the 2016 AQMP mobile source control measures, the analysis in the Program EIR contains assumptions regarding future electricity demand. For example, several 2016 AQMP control measures would increase the future demand for electricity as part of achieving the control measures' targets of zero and near-zero emissions from on-road and off-road vehicles. Increasing the penetration of zero and near-zero vehicles in fleets regulated by the SCAQMD would in turn increase the future demand for electricity on providers located in the Basin and in other areas of California that provide imported electricity to the Basin. For the purpose of this analysis, a zero emission vehicle is assumed to be an electric vehicle and a near-zero vehicle, also known as an AT-PZEV (an acronym for Advanced Technology Partial Zero Emission Vehicle) is assumed to be a vehicle that meets the super ultra-low emission vehicle (SULEV) and PZEV tailpipe emissions requirements.

While the electrification of motor vehicles and other commercial and industrial equipment would greatly reduce fossil fuel usage in the Basin, concurrently, there may be an increased demand for electricity and a corresponding increase in emissions associated with electricity generation. SCAQMD staff met[2] with representatives from representatives from Southern California Edison (SCE) and the Los Angeles Department of Water and Power (LADWP), two power producers in the Basin, to discuss the potential adverse impacts on the current electrical grid, the need for additional power generation, and any reliability concerns that may be caused by the adoption of their proposed Protocol. Both SCE and LADWP have forecasted the potential load impacts on electricity demand that would be expected to occur from increased charging of electric vehicles in the future. Representatives from the SCE and LADWP have indicated that they currently do not have the need to build any new electric generation facilities or alter the transmission system due to projected EV charging demands. Additionally, according to the most recent Integrated Resource Plan (IRP) published in December 2014, the LADWP has determined that the doubling of electric vehicles will not require additional generation or transmission beyond currently planned upgrades. Both of these electric utility companies have indicated that they will be able to meet the increased energy demands if the 2016 AQMP is implemented because excess power from renewable sources of energy such as solar and wind power is expected. The associated emissions from the increased electricity generation needed to meet this projected energy demand have been included in the emissions inventory of the 2016 AQMP.

Relative to existing electricity use and projected future peak electricity demand from the 2016 AQMP, implementation of the AQMP control measures is expected to result in an overall worst-case increase from baseline year 2016 of approximately 10,227 gigawatt-hours (GWh) in the year 2023 and 18,029 GWh in 2031 (see Subchapter 4.2 – Energy of this Program EIR). The 2012 AQMP Final Program EIR, which also evaluated increased electricity demand from AQMP control measures, noted that there were a number of power plant projects planned in southern California to meet future electricity needs. From year 2012 through 2014, in southern California, new power plants representing over 2,900 MW of electricity generation have become operational while additional power plant projects representing 785 MW are currently under construction[3], and a number are in the planning stages (CEC, 2016m).

[2] Meeting with representatives from SCE, LADWP, and SCAQMD at SCAQMD Headquarters on December 12, 2014.

[3] Neither of the power plant facilities currently under construction is located within the boundaries of the SCAQMD.

Electricity generation within the Basin is subject to applicable SCAQMD rules such as Rule 1134 – Emissions Oxides of Nitrogen from Stationary Gas Turbines, Rule 1135 – Emissions of Oxides of Nitrogen from Stationary Gas Turbines, and Regulation XX – RECLAIM. These rules and regulations specifically regulate NOx emissions (the primary pollutant of concern from natural gas combustion to generate electricity) from existing power generating equipment. Although emissions from existing electric utilities in the Basin are capped under the RECLAIM program (or under Rule 1135), any new power generating facilities needed in the Basin to accommodate increased electricity demand would be subject to SCAQMD Regulation XIII – New Source Review or Rule 2005 – New Source Review for RECLAIM. Both Regulation XIII and Rule 2005 require: 1) the installation of BACT; 2) air quality modeling to demonstrate that the emission increases would not result in significant air quality impacts (so there would be no localized impacts); and 3) emission offsets (through either the facility's own emission reduction credits (ERCs) via Regulation XIII or RECLAIM trading credits (RTCs) via Regulation XX before permits can be issued. If a facility provides ERCs to offset the increase in NOx emissions, the facility would be required to provide the ERCs at a ratio of 1.2 to 1.0. For example, 1.2 pounds of NOx ERCs would be required to offset an increase of 1.0 pound of NOx emission from the new power generating source. However, if a facility is in the NOx RECLAIM program, the NOx RTC offset ratio is 1.0 to 1.0 such that 1.0 pound of NOx RTCs would be required to offset 1.0 pound of NOx emissions from the new power generating source at a RECLAIM facility. Going forward, any new power generating projects would be incorporated into the emission inventories used in future AQMPs and additional control measures would be identified, if necessary and feasible, to limit NOx emissions from power generating sources. The 2016 AQMP is expected to achieve an overall net NOx emission reduction sufficient to maintain attainment with all NO2 ambient air quality standards and, because NOx is an ozone precursor, continue making expeditious progress in achieving the federal one-hour and eight-hour ozone standards.

Concurrent with the anticipated increased demand for electricity generated as a result of implementing the 2016 AQMP control measures, the amount of gasoline and diesel fuels and the corresponding emissions from combustion would be expected to be reduced. In particular, combustion emissions from gasoline and diesel fuels would be displaced by combustion emissions from natural gas, which is the primary fuel used for generating electricity in the Basin. The quantity of emissions from diesel and gasoline combustion are much higher than emissions from the combustion of natural gas. For this reason, the amount of combustion emissions from electricity generation are expected to decline in the future.

It is important to note that there could be an increase in emissions from generators that may be used to charge batteries in remote locations where no grounded power source is available. Generators are regulated sources in the Basin and existing SCAQMD regulations that apply to generators and emergency generators would also apply to generators used to charge batteries. New generators would be subject to SCAQMD Rule 1470 - Requirements for Stationary Diesel Fueled Internal Combustion (IC) and other Compression Ignition (CI) Engines in addition to Regulation XIII or Rule 2005 for RECLAIM facilities. Existing generators are subject to SCAQMD Rule 1110.2 – Emissions from Gaseous and Liquid Fueled Internal Combustion Engines. While Rule 1110.2 does not establish a facility emission cap, per se, it contains a stringent NOx emission rate based on the engine category. Small portable equipment may also be regulated under the state registration program, which contains emission limitations for NOx, VOCs, and CO.

For electricity generating facilities located outside of the Basin, the SCAQMD rules and regulations discussed above do not apply. In 2014, about 67 percent of the electricity used in California was generated in-state and about 33 percent was imported (see Section 3.3.2 of this Program EIR). While the electricity generating facilities located outside of the Basin would not be subject to SCAQMD rules and regulations, rules and regulations of the local air pollution control agencies and the U.S. EPA would still apply. Depending on an area's attainment status, state or local air pollution control agencies are required to establish New Source Review regulations for new and modified facilities that generally require compliance with BACT or lowest achievable emission reduction technology. Most in-state electricity generating plants use natural gas, which provides a relatively clean source of fuel (as compared to coal- or diesel-fueled power plants).

As of year 2014, approximately 21 percent of electricity generated in California was generated by renewable sources such as biomass, geothermal, small hydro, solar, and wind, which are clean sources of energy. Renewable sources of electricity generate little, if any, air pollutant emissions. An increased use of renewables and other clean technologies is expected to continue minimizing emissions from the generation of electricity. State law requires power producers to increase the amount of renewable energy used to generate electricity by 20 percent in 2017, by 33 percent in 2020, and by 50 percent in 2030.

SB 1368 (Perata, Chapter 598, Statutes of 2006) set an Emission Performance Standard (EPS) for California load-serving entities (LSE) such as Pacific Gas and Electric (PG&E) and Los Angeles Department of Water & Power (LADWP). The EPS has been a driving force behind California's utilities ending or planning to end, affiliations (contracts and/or ownership) with coal- and petroleum coke-fired generation resources, especially with large out-of-state plants. As a result, according to the CEC, by 2026, virtually all electricity generated by known coal- and petroleum coke-fired generation resources to serve California loads is expected to end (CEC, 2015). Further, oil-fired generators are also unlikely to be able to meet the EPS.

As noted earlier, the 2016 AQMP is designed to reduce criteria pollutant emissions in order to meet federal air quality standards and achieve corresponding beneficial reductions in toxic risk and GHG emissions for an overall air quality benefit. The 2016 AQMP has the potential to create a significant impact on electricity demand; however, the existing and future air quality and GHG rules and regulations are expected to minimize operational emissions associated with increased electrical generation. Furthermore, the electricity providers have committed to meeting the increased demand while complying with applicable regulations. Therefore, implementation of the 2016 AQMP control measures are not likely to generate significant adverse air quality impacts due to increased demand for electricity. In addition, future sources of electricity are increasingly being generated by renewable resources. For example, 700 MW of electricity is currently being generated by solar projects located in the four-county region[4].

[4] https://www.californiasolarstatistics.ca.gov/reports/locale_stats/

4.1.6.2.2 Impacts from Control of Stationary Sources

A number of 2016 AQMP control measures are expected to generate emission reductions from the installation and operation of air pollution control equipment. The various types of air pollution control equipment typically target one or more criteria and TAC pollutants. Although control measures generally identify the most effective types of air pollution control equipment for the target pollutant for each source category, operation of the air pollution control equipment may have the potential to generate other pollutants. The following discussions identify the 2016 AQMP control measures that may result in the installation of control equipment that will reduce emissions of the target pollutant(s), but will also have the potential to generate emissions of a different pollutant, resulting in potential air quality impacts. The following discussions focus only on those air pollution control technologies with the potential to generate air pollutants. Other types of air quality impacts such as construction emissions to install air pollution control equipment, emissions from electricity production due to increased electricity demand, etc., are not discussed in this subsection as they are addressed elsewhere in this subchapter.

Control Measure CMB-02 seeks annual average NOx emission reductions from unregulated commercial space heating furnaces by incentivizing the replacement of existing older boilers, water heaters, and space heating furnaces. This control measure will apply to manufacturers, distributors, sellers, installers and purchasers of commercial boilers, water heaters and furnaces used for heating. The control measure has two components: 1) to continue to implement the NOx emission limit (14 ng/J (20 ppm) in SCAQMD Rule 1111 - Reduction of NOx Emissions From Natural-Gas-Fired, Fan-Type Central Furnaces, for residential space heaters starting in 2014; and 2) to incentivize the replacement of older boilers, water heaters, and space heaters with newer and more efficient low NOx boilers, water heaters, space heaters, and/or "green technologies" such as solar heating or heat pumps. The new boilers and water heaters would be required to comply with SCAQMD rule emission limits and the new space heaters would be required to meet a specified emission limit. If needed, the SCAQMD will consider amending Rule 1111 along with SCAQMD Rule 1121 – Control of Nitrogen Oxides from Residential Type, Natural Gas-Fired Water Heaters, to add a heat input based emission limit which will result high efficiency units with lower NOx emissions when compared to standard efficiency units. Currently these rules contain heat output based limits which means that high efficiency water heaters and furnaces emit the same amount of NOx per day as standard efficiency units. In addition, the SCAQMD will also consider developing a new rule to limit NOx emissions from certain commercial and residential heating furnaces which are currently unregulated.

Control Measure CMB-05 includes further NOx reductions such as reducing the NOx annual allocation and available RTCs for some NOx RECLAIM facilities. Under RECLAIM program, operators of affected facilities are currently able to choose the most effective method for reducing NOx emissions. Options to comply with NOx RECLAIM could include: reducing operations, installing NOx control equipment, using excess RTCs generated by the facility, or purchasing excess RTCs from other RECLAIM facilities.

The RECLAIM program is subject to several legal mandates. The Health and Safety Code requires the SCAQMD to monitor the advancement in BARCT, and if BARCT advances, the SCAQMD is required to periodically re-assess the overall facility caps, and to reduce the RTC holdings to a level equivalent to command-and-control BARCT levels. CMB-05 identifies a series of approaches that can be explored to make the RECLAIM program more effective in ensuring equivalency with command-and-control regulations implementing BARCT, and to potentially generate further NOx emission reductions at RECLAIM facilities.

One of the approaches in CMB-05 for obtaining further NOx emission reductions would be to apply command-and-control regulation overlays to certain RECLAIM facilities. Such an approach would likely require installation of air pollution control technologies to further control NOx emissions. The most likely air pollution control technology expected to be installed is SCR which has been used to control NOx emissions from stationary sources for many years. Although SNCRs could also be used as a control device, the use of SCRs would result in larger emission reductions than SNCRs and a corresponding lower use of ammonia. In order to estimate impacts from the worst-case, it is assumed that SCRs will be constructed as part of the 2016 AQMP. SCR operates by injecting ammonia into the exhaust stream to promote chemical reactions through contact with a catalyst to prevent the formation of NOx. The ammonia converts NOx to elemental nitrogen and oxygen in an oxidizing environment. As the exhaust gases along with the ammonia pass over the catalyst, 75 to 90 percent of NOx emissions that would otherwise be formed would be reduced. In addition, SCR is effective at reducing 50 to 90 percent of the VOC emissions, and 30 to 50 percent of the PM10 emissions.

When using SCR, there is the potential for the secondary formation of particulate matter (PM) from ammonia slip due to excess ammonia in the exhaust stream. Over the years, the CEQA documents prepared by the SCAQMD for NOx control rules have evaluated the potential for secondary PM formation from SCR systems. As part of the analyses prepared for multiple CEQA documents specific to the SCAQMD's NOx control rules, the SCAQMD conducted an extensive literature review and contacted a number of SCR manufacturers and vendors. The results of this data collection effort indicated that the amount of ammonia slip remaining in the exhaust stream depends on a variety of factors including space velocity, ammonia to NOx molar ratio, temperature, and NOx inlet concentration.

Initially, the analysis indicated that SCRs in use at that time typically had an ammonia slip level ranging from approximately 10 to 20 ppm. Ammonia slip levels in this range were the result of the following factors. First, to ensure maximum NOx reduction efficiency, SCR operators typically injected excess ammonia (e.g., a higher ammonia to NOx molar ratio, into the flue gas to ensure achieving the appropriate NOx reduction reaction). Any excess ammonia that did not react with the NOx, passed or "slipped" through the reactor vessel and was released into the atmosphere. To account for an inevitable decline in the effectiveness of the catalyst over time, to achieve the same NOx reductions, it often became necessary to increase the amount of ammonia injected into the flue gas, which in turn increased the amount of ammonia slip. The analysis also found that one of the main operational problems that contributed to ammonia slip was due to an uneven distribution of NOx in the duct ahead of the catalyst, which created a non-uniform mixture of ammonia and NOx over the entire cross-section of the duct and resulted in high levels of ammonia slip. Finally, the early CEQA documents prepared by SCAQMD staff for NOx control rule projects indicated that ammonium nitrate (NH4NO3) could also be formed at temperatures less than 169^{o} C.

The SCAQMD's early CEQA documents for NOx control rule projects concluded that the formation of ammonium nitrate (NH4NO3) would not create a significant adverse air quality impact if ammonia slip was reduced to 10 ppm or less. However, since the early 1990s, the SCR technology has progressed substantially through development of better injection systems that result in a more even distribution of NOx ahead of the catalyst so that the potential to generate ammonia slip is reduced. Further, ammonia injection rates are now more precisely controlled by model control logic units that work in combination of feed-back control and feed forward control using a proportional/integral controller that sets flow rates by predicting SCR outlet ammonia concentrations and calibrating them to a set reference value. Other approaches for reducing ammonia slip include: maintaining a proper ammonia to NOx molar ratio, decreasing the exhaust gas flow rate, maintaining consistent exhaust velocity, and maintaining an optimal temperature regime. As a result of these advances, SCAQMD revised its NOx control rules by limiting ammonia slip to 5.0 ppm or less and this is included as an enforceable permit condition on the SCAQMD permit to construct/operate. In addition, operators are required to monitor ammonia slip by conducting an annual source test and to operate a continuous emissions monitoring system (CEMS) to accurately monitor the ammonia-to-emitted-NOx mole ratio at the inlet of the SCR. Lastly, amendments to SCAQMD Rule 1325 – Federal PM2.5 New Source Review Program are currently being proposed that will regulate ammonia (NH3) as a pollutant that will require offsets, BACT, and modeling.

Another type of potential air quality impact from SCRs is the potential for SCR catalysts to promote SO2 to SO3 oxidation. Since the early 1990s, catalyst research has focused on reducing SO2 oxidation. Over 25 years ago, SCR vendors reported that SO2 oxidation of their catalysts was less than one to four percent (SCAQMD, 1990). SO2 to SO3 conversion has been reduced by decreasing the amount of active ingredient (typically vanadium pentoxide) in the catalyst, adding an active element as a promoter and improving the dispersion of active elements. SCR vendors have indicated that problems with ammonium particulates tend to be minimal if the amount of ammonia slip in the flue gas averages less than five to 10 ppm. Generation of particulate matter due to the creation of ammonium bisulfate (NH4HSO4) and ammonium sulfate ((NH4)2SO4), can be alleviated by reducing the amount of ammonia slip (SCAQMD, 1990).

In addition to the current limit of ammonia slip (e.g., 5.0 ppm or less), the 2016 AQMP contains control measure BCM-05, which would further limit the amount of ammonia slip from air pollution control equipment such as SCR. This control measure would require continued advances in SCR catalyst technologies to reduce potential ammonia slip to less than currently required levels.

Control measure BCM-04 is expected to reduce ammonia emissions (a PM2.5 precursor) from livestock waste, with an emphasis on reducing emissions from dairy manure. There are a number of control approaches that could be implemented to achieve ammonia emission reductions, but only thermal gasification was identified as having the potential to generate air quality impacts from control equipment operation. Gasification is a thermal conversion process in which both heat and a combustible product gas are produced. Thermal gasification, as applied to chicken manure generated during egg-laying, for example, requires a reduction in the manure moisture content by approximately 20 percent. To achieve this reduction in moisture content, the chicken manure is fed into a thermal gasifier where moisture is evaporated, organic solids are converted into "syngas," and mineral-rich ash is produced. Because thermal gasification requires a combustion source, combustion emissions are generated, including NOx emissions.

Although thermal gasifiers generate combustion emissions, there are a number of environmental benefits associated with the process. For example, gaseous products formed during the gasification may be further used for heating or electricity production. The main combustible gas components are CO, CO2, H2O, H2, CH4, and other hydrocarbons. Combustible gas, produced during gasification, can be cleaned and used for the synthesis of special chemical products or for the generation of heat and/or electricity. Syngas produced by the process could be ducted to a thermal oxidizer for heat generation and combustion pollutants would be generated.

Gasification producing syngas is a form of biomass energy conversion which produces a fuel that could substitute for fossil fuels in high efficiency power generation as well as in clean heat and power applications. For example, the gasification process could produce heat, this heat could in turn be used to reduce the moisture content of fresh manure. Similarly, renewable biomass and biomass-derived fuels could readily replace fossil fuels in many of the current energy utilization applications with concomitant environmental benefits. Since biomass is a carbon neutral fuel, the net emissions of CO2 (a GHG) would amount to zero (U.S. Department of Energy, 2010). Although its neutrality affects global conditions, the GHG benefits will occur locally in California.

Ash is a useful byproduct of this process and it can be used in an animal feed supplement. The ash can also be repurposed as a soil amendment to substantially increase the efficiency of and reduce the need for traditional chemical fertilizers, while greatly enhancing crop yields. The production and transportation of chemical fertilizers is fossil fuel intensive, so by reducing their use reduces the associated carbon emissions that would otherwise be generated. Moreover, ash-amended soils have the potential to reduce runoff of phosphorus into surface waters, and reduce leaching of nitrogen into groundwater.

Although the thermal gasification process is an established technology, its use as a means of reducing ammonia emissions from animal manure production is considered to be an emerging technology. However, in other applications, if the desired product is only heat, whether for industrial process heat, space heating, or water heating, the thermal gasification product may be cost effective (U.S. Department of Energy, 2010). Because thermal gasification related to manure management is in the testing stages, the costs of installing and maintaining the system may not be cost effective at this time. As a result, until further testing is done, it is not likely that this technology will become widespread, so any air quality impacts will be minimal.

4.1.6.2.3 Impacts from Using Lower VOC Materials

Unlike past AQMPs, the 2016 AQMP contains only one control measure, CTS-01, that would further reduce the VOC content of coatings, solvents, adhesives, and sealants through the promulgation of future SCAQMD rules. This is due in part because the 2016 AQMP control strategy continues to focus primarily on NOx emission reductions, with additional strategic and cost-effective VOC reductions, as the best way to minimize the general public's exposure to unhealthy ozone pollution not only in the target attainment year, but also during the course of the NOx control effort. In addition, control measure CPP-01 would further reduce VOC emissions by revising or eliminating the exemption for low vapor pressure solvents in consumer products. Consumer products include, but are not limited to: detergents; cleaning compounds; polishes; floor finishes; cosmetics; personal care products such as antiperspirants and hairsprays; home, lawn, and garden products; disinfectants; sanitizers; automotive specialty products; and aerosol paints.

The majority of the VOC emission reductions from CTS-01 are projected to come from continuing the development of the proposed amendments to SCAQMD Rule 1168 – Adhesive and Sealant Applications, where were suspended in 2014. In addition, the following SCAQMD rules may be affected by this control measure, RACT evaluations and potential loophole elimination: Rule 1106 – Marine Coating Operations; Rule 1106.1 – Pleasure Craft Coating Operations; Rule 1124 – Aerospace Assembly and Component Manufacturing Operations; Rule 1128 – Paper, Fabric, and Film Coating; Rule 1107 – Coating of Metal Parts; Rule 1136 – Wood Product Coatings; Rule 314 – Fees for Architectural Coatings; Rule 1113 – Architectural Coatings; Rule 1143 – Consumer Paint Thinners and Multi-Purpose Solvents; and Rule 1171 – Solvent Cleaning Operations.

The analysis of emissions that may result from reducing the VOC content of potentially affected materials focuses on potential emission increases of other possibly toxic pollutants that may result from changing coating formulations. To further reduce the content of affected materials, products would likely be reformulated with water-based or exempt compound formulations. The following subsections identify potential air quality impacts from reducing the VOC content of affected materials. While the following analysis focuses primarily on coatings, some of the discussion points (e.g., substitution, more reactivity, and low vapor pressure) could also apply to consumer products[5].

Control measure CTS-01 is expected to lower the VOC content of many coatings from 50 grams per liter to 25 grams per liter. Control measure CPP-01 is expected to reduce VOC emissions from consumer products by revising the exemptions for the use of low vapor pressure VOC solvents. To achieve further VOC reductions, control measure CPP-01 would further reduce VOC limits in various consumer product categories, setting limits for other categories and revisiting chemical-specific exemptions in existing product categories. The following issues have been raised with regard to reformulated coatings in the 2003, 2007, and 2012 AQMPs.

The potential air quality impacts associated with reformulation of coatings have been extensively evaluated in previous AQMPs starting with the 2003 AQMP, as well as in a number of new rules and amendments to existing coatings rules starting in the late 1990s. Some of the early coatings rules and rule amendments adopted by the SCAQMD, as well as evaluations of coatings control measures in the 2003 and subsequent AQMPs, included evaluations of the possible effects of shifting coating formulations primarily from solvent-based to water-based and/or exempt-solvent formulations. During the promulgation of coating rules and rule amendments and previous AQMPs, commenters raised the potential for the following air quality impacts that could result from reformulated products: more thickness of the coating due to multiple applications; illegal thinning to reduce the viscosity of the reformulated coatings; more priming; more topcoats; more

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[5] Aerosol coating products are regulated by CARB under a reactivity-based regulation. This regulation limits the ozone formation potential of all aerosol coating product emissions. As a result, the reactivity discussion below would not apply to this consumer products category.

touch-ups and repair work; more frequent recoating; product substitution; more reactivity; and the synergistic effects of these issues combined. Even though CTS-01 is not expected to substantially change coating components, these or similar issues could continue to be raised. Each issue is summarized in the following bullet points along with the associated conclusions reached in previous AQMPs for each issue. This analysis assumes that the conclusions reached in the previous AQMPs would continue to apply for CTS-01.

- **More Thickness –** In the past, it has been asserted that reformulated compliant water- and solvent-borne coatings: 1) can be very viscous because they are formulated using a high-solids content) and, therefore, are difficult to handle during application; and 2) tend to produce a thick film when applied directly from the can which indicates that a smaller surface area is covered with a given amount of material, thereby increasing the amount of coatings and VOC emissions per unit of area covered.

  Response – Past research has shown that compliant low-VOC coatings are not necessarily formulated with higher solids content than conventional coatings. A low-VOC coating is expected to cover the same or larger surface area than a high-VOC coating. Further, there is no evidence that there is an inverse correlation between solids content and coverage area (SCAQMD, 2007a).

- **Illegal Thinning –** In the past, it has been asserted that thinning occurs in the field in excess of what is allowed by the SCAQMD rule limits. Further, because reformulated compliant water- and solvent-borne coatings are more viscous (e.g., high-solids content), painters need to adjust the properties of the coatings to make them easier to handle and apply. In particular for solvent-borne coatings, this adjustment consists of thinning the coating as supplied by the manufacturer by adding some solvent to reduce its viscosity. The added solvent increases VOC emissions back to or sometimes above the level of older formulations.

  Response - SCAQMD staff conducted extensive research prior to 1998 to determine whether the thinning of materials beyond the allowable levels actually occurred in the field. SCAQMD staff conducted unannounced site visits to evaluate contractor practices, collected samples as applied and supplied from contractors, and analyzed paint samples from retail outlets. No thinning beyond SCAQMD rule limits was identified. In addition, the CARB 2005 Architectural Coating Survey provided results of compliance with the CARB Suggested Control Measure for Architectural Coatings. In most cases, the percent of complying market share from the 2005 survey improved or was approximately the same as the 2001 CARB survey. Therefore, the 2007 AQMP Final Program EIR concluded that widespread thinning happens rarely; when it does occur, it is unlikely to occur at a level that would lead to a substantial overall emissions increase when compared to emissions from higher VOC coatings (SCAQMD, 2007a).

  Currently, a majority of architectural coatings available in the marketplace are waterborne. Thinning is not an issue for waterborne coatings as thinning with water would not increase the VOC content of affected coatings. Of the total coatings sold in 2008, for example, only seven percent were solvent-based which equates to approximately three million gallons. Subsequent amendments to Rule 1113 have further reduced the availability of solvent-based coatings.

Amendments that reduced the scope of the small container exemption in Rule 1113 have also resulted in a reduction in solvent-based coatings, further lessening the potential adverse impact of thinning with a solvent. For the years between 2009 and 2011, the overall volume of solvent-based coatings was reduced by approximately 22 percent, so the potential for thinning was reduced by an equivalent amount. Amendments to Rule 1113 in 2011, 2013, and 2016 have further reduced the overall volume of solvent-based coatings. Finally, the adoption and implementation of Rule 1143 – Consumer Paint Thinner and Multi-Purpose Solvents, requires the use of paint thinners that have a VOC content of less than or equal to 25 grams per liter, resulting in paint thinners that are based on exempt solvents, further reducing the VOC impacts from thinning of solvent-based architectural coatings.

- **More Priming –** It has been previously asserted that reformulated compliant low-VOC water- and solvent-borne topcoats do not adhere as well as higher-VOC solvent-based topcoats to unprimed substrates. Therefore, the substrates must be primed with typical solvent-based primers to enhance the adherence quality. Industry representatives have testified that the use of water-borne compliant topcoats could require more priming to occur in order to promote adhesion. Additionally, it has been asserted that water-borne sealers do not penetrate and seal porous substrates like wood, as well as traditional solvent-borne sealers. This allegedly results in three or four coats of the sealer per application compared to one coat for a solvent-based sealer, resulting in an overall increase in VOC emissions for the coating system.

  Response - SCAQMD staff evaluated surface preparation information in coating product data sheets and studies on the topic and concluded that low-VOC coatings do not require a substantially different surface preparation than conventional coatings. Both low-VOC and conventional coatings for both architectural and industrial maintenance applications were demonstrated to have the ability to adhere to a variety of surfaces. Based on the coating sheets, the material needed and the time necessary to prepare a surface for coating was approximately equivalent for low-VOC and conventional coatings (SCAQMD, 2007a).

  A more recent trend for coating manufacturers is to produce ultra-low VOC coatings that are a primer and topcoat in one, thus, eliminating an entire step in the coating process. Most major coatings manufacturers now offer such products, some of which have a VOC content as low as 5.0 grams per liter. Therefore, any impacts from priming have been substantially reduced as a result of reformulation.

- **More Topcoats –** It has been previously asserted that reformulated compliant water- and low-VOC solvent-borne topcoats may not cover, build, or flow-and-level as well as the solvent-borne formulations. Therefore, more coats are necessary to achieve equivalent cover and coating build-up.

  Response - Based on information in the product data sheets, SCAQMD staff found that while the average drying time for lower-VOC coatings increased when compared to conventional coatings, the development of non-volatile, reactive diluents combined with hypersurfactants caused the performance of the lower-VOC coatings to equal or outperform the traditional, solvent containing coatings. Resistance to chemicals, corrosion, chalk, impact, and abrasion; adhesion; and the ability to retain gloss and color was found to be similar in lower-VOC and conventional coatings. Coating manufacturer data also indicated that low-VOC and conventional coatings for both architectural and industrial maintenance applications are durable and long lasting and that more frequent recoating was not necessary for low-VOC coatings when compared to conventional coatings (SCAQMD, 2007a).

- **More Touch-Ups and Repair Work –** It has been previously asserted that reformulated compliant water- and low-VOC solvent-borne formulations dry slowly, and are susceptible to damage such as sagging, wrinkling, alligatoring, or becoming scraped and scratched. Claims have also been made that the high-solids solvent-borne alkyd enamels tend to yellow in dark areas, and that water-borne coatings tend to blister or peel, and also result in severe blocking problems. All of these problems were reported to require additional coatings for repair and touch-up.

  Response - Based on SCAQMD staff's evaluation of the durability characteristics information contained in the coating product data sheets, low-VOC coatings and conventional coatings have comparable durability characteristics. These conclusions are supported by the National Technical Systems and other coating studies. As a result, it is not anticipated that more touch up and repair work would be needed if low-VOC coatings are used.

- **More Frequent Recoating –** It has been previously asserted that the durability of the reformulated compliant water- and low-VOC solvent-based coatings is inferior to the durability of the traditional solvent-borne coatings. Durability problems include cracking, peeling, excessive chalking, and color fading, which all typically result in more frequent recoating. As a result, more frequent recoating would be necessary resulting in greater total emissions than would be the case for conventional coatings.

  Response - The latest data from the coating manufacturers that was obtained by SCAQMD staff indicate that the new generation of waterborne coatings is performing as well if not better than their solvent-based counterparts. These commercialized products are formulated with better performing raw materials, including superior resin chemistry and higher performing pigments, resulting in better hiding and coverage and overall durability. Therefore, a reduction in coating usage is expected.

- **Substitution -** It has been previously asserted that reformulated compliant water- and low-VOC solvent-borne coatings are inferior in durability and are more difficult to apply, so consumers and contractors will substitute better performing high VOC coatings in other categories for use in categories with low compliance limits. An example of this substitution could be the use of a higher VOC product currently sold under the small container exemption, which has a higher VOC content limit requirement, in place of a lower-VOC coating.

  Response - SCAQMD staff determined that substitution is not expected to occur because CARB and SCAQMD rules prohibit the application of certain coatings on substrates for which they are not intended. In addition, based on product data sheets and studies, there are generally a substantial number of low-VOC coatings in a wide variety of coating categories that are currently available. Further, as coating rules become more stringent, VOC content limits have and will continue to converge to similarly low levels for many coating categories.

With advances in resin chemistry and higher performing pigments, compliant coatings that are as durable as solvent-based coatings are widely available. In the rare event that substitution does occur, it is expected that future compliant coatings would still achieve overall VOC emission reductions. If substitution occurs, the net effect is that anticipated overall VOC emission reductions would be less than expected, but there would not be an overall increase in emissions as compared to the existing setting. Consequently, it is not expected that control measure CTS-01 requiring a lower overall VOC content for affected products will result in significant adverse air quality impacts from the substitution of low-VOC coatings with higher-VOC coatings (SCAQMD, 2007a).

- **Reactivity -** It has been previously asserted that reformulated compliant low-VOC water- and solvent-borne coatings contain solvents that are more reactive than the solvents used in conventional coating formulations. Water-borne coatings perform best under warm, dry weather conditions, and are typically recommended for use between the months of May and October. Since ozone formation is also dependent on the meteorological conditions, it has been asserted that the use of waterborne coatings during this period increases the formation of ozone. As a result, coating solvent, adhesive, and sealant rules should be based on reactivity rather than a mass based approach.

  Response - Different types of solvents have different degrees of reactivity, which is the ability to accelerate the formation of ground-level ozone. As noted in the 2003 AQMP Final Program EIR, the speciated organic gas emissions from use of solvent-borne architectural coatings, for example, are 24 percent more reactive than the official VOC inventory would suggest. This observation suggests that solvent-borne architectural coatings, for example, may actually be more reactive than low-VOC coatings especially water-based coatings. Further, the percent of solvent content found in solvent-borne formulations is much greater than the quantity of solvents found in waterborne coatings, which would make the weighted maximum incremental reactivity (MIR) in solvent-borne coatings greater than the already higher average MIR (SCAQMD, 2003). Therefore, based on the above information, SCAQMD staff has continued to monitor all reactivity-related research since the 2007 AQMP. Finally, based on the latest research and analysis, as well as the recommendations of the research, staff supports the continuation of a mass-based ozone control strategy, with future consideration for a reactivity-based approach.

- **Synergetic Effects of the Combined Issues –** Individually, each of the issues do not individually result in a significant adverse air quality impact; but it has been suggested that acting together in combination, they may have the potential to generate significant adverse air quality impacts. Based on the previous discussions, several of the potential issues have been shown to be untrue, not occur, or their effects are generally minor. Therefore, it can be concluded that the synergistic effect of all the issues combined would not be expected to generate a significant adverse air quality impact. The Final Program EIR for the 2007 AQMP concluded that even if it is assumed that some of the alleged activities do occur, the net overall effect of reducing the VOC content of coatings and other consumer products is expected to result in a reduction in VOC emissions.

In addition to control measure CTS-01, the 2016 AQMP contains control measure FLX-02, which notes that owners of many existing homes and businesses will, in the future, update and improve their facilities and many have the option to modernize using cleaner, lower emission, less toxic alternative processes and materials. However, since many of these cleaner options may not be the lowest-cost option, their use may need to be incentivized. This control measure envisions providing incentives to owners of residences and businesses to choose the cleanest technologies as they replace equipment or material and upgrade facilities and to provide incentives to encourage businesses to move into these technologies sooner. The potential air quality impacts from replacing or retrofitting stationary or mobile sources are evaluated elsewhere in this subchapter. The analysis of control measure FLX-02 focuses on potential incentives for owners to paint new and existing structures, thereby generating VOC emissions.

As indicated in control measure FLX-02, incentives such as reduced recordkeeping pursuant to SCAQMD Rule 109 – Recordkeeping for Volatile Organic Compound Emissions, may incentivize the use of super compliant coatings (e.g., coatings that contain 50 grams or less of VOC per liter of material). This control measure is not expected to generate significant adverse air quality impacts because there is a larger number of super compliant coatings that have VOC contents substantially less than 50 grams per liter. Further, assuming a coating with a VOC content of 50 grams per liter is used on new or existing structures, emissions may be low based on other constraints such as the number of workers available, the size of the structure, and the amount of an area that can be covered in one day. A large number of owners would not be expected to paint their structures on the same day, but would instead determine when to repaint depending on resources, finances, available workforce, etc. Similarly, owners would not be expected to apply for and receive the applicable incentives at the same time, which would also reduce the likelihood that a large number of structures would be painted on the same day. Finally, with regard to painting or repainting existing structures, there are a variety of factors that determine how often a structure would need to be repainted, including weather, chemical and physical properties of the area, and activities that occur at the structure. Based on all of these factors, air quality impacts from control measure FLX-02 are expected to be limited. Thus, implementation of FLX-02 should not cause increased painting, but instead would replace higher emitting coating products with cleaner products or methods.

Based on the preceding analysis of potential air quality impacts from implementing future coatings rules and incentive programs, the overall air quality effects would be a VOC emission reduction and beneficial to air quality in the Basin. Consequently, implementing control measures CTS-01, FLX-02, and CPP-01 into future rules or providing incentives to use super compliant coatings would not be expected to generate significant adverse air quality impacts.

4.1.6.2.4 Impacts from Mobile Sources

There are a number of 2016 control measures that would reduce emissions from mobile sources by accelerating the penetration of partial zero-emission and zero emission vehicles. Air quality impacts from mobile source control measures could occur from control measures that would require or provide incentives to increase penetration of zero and near-zero emission vehicles. Increasing penetration of these vehicles may take the form of providing incentive funding to scrap an older vehicle and purchase a zero and near-zero emission vehicle instead. Alternatively, some control measures would incentivize the accelerated removal of older vehicles from fleets within the Basin. Under both of these scenarios, vehicles eliminated from fleets would likely be scrapped and car scrapping operations have the potential to generate PM emissions and other emissions depending on the scrapping process chosen to specifically scrap the vehicle. It should be noted that some control measures that would accelerate the penetration of zero and near-zero emission vehicles would allow the replacement of older vehicles upon the normal retirement of that vehicle. However, these types of control measures are not considered in the following analysis of PM impacts that may result from vehicle scrapping.

Control measure MOB-05 would accelerate the penetration of zero and near-zero emission light-duty vehicles. Light-duty vehicles are defined as passenger cars and light trucks up to 8,500 pounds in gross vehicle weight (GVW). Currently, CARB implements a "Clean Vehicle Rebate Project" (CVRP) that provides individual vehicle incentives of up to $5,000 for fuel cell vehicles, $2,500 for full zero-emission vehicles, $1,500 for plug-in hybrid vehicles, $900 for neighborhood electric vehicles, and $900 for zero-emission motorcycles. This control measure would continue the CVRP through 2023 with a minimum number of 15,000 additional vehicles per year to be incentivized through the CVRP.

Control measure MOB-06 would implement a strategy to accelerate the retirement of older light-duty gasoline- and diesel-powered vehicles up to 8,500 pounds GVW. This control measure is expected to retire at a minimum, 2,000 light- and medium-duty vehicles per year. The proposed incentives would be up to $9,500, which includes a replacement voucher under the AB 118 Enhanced Fleet Modernization Program (EFMP) program and Greenhouse Gas Reduction Fund.

Control measure MOB-06 would seek emission reduction benefits through the early deployment of near-zero, partial zero-emission, and zero-emission light-heavy- and medium-heavy-duty vehicles with gross vehicle weight ratings (GVWR) from 8,501 lbs to 33,000 pounds. This control measure would generate additional emission reductions through the early introduction of electric hybrid vehicles. The proposed actions would continue the state hybrid truck and bus voucher incentive project (HVIP) which accelerates the deployment of hybrid and zero-emission medium-heavy-duty vehicles in the Basin.

Control measure MOB-08 would generate additional emission reductions from existing heavy heavy-duty vehicles greater than 33,000 pounds GVWR through an accelerated vehicle replacement program with new engines that meet the cleanest optional NOx emissions standard or through regulatory actions. In addition, for heavy-duty vehicles not replaced with new models, existing vehicle engines would be repowered with commercially available engines meeting one of the optional NOx exhaust emission standards established by CARB or modified with retrofit kits to achieve lowest possible emission levels. This control measure seeks additional emission reductions from on-road heavy-duty vehicles beyond the emission reductions targeted in CARB's Truck and Bus Regulation.

Control measure MOB-09 would incentivize the early deployment of zero and near-zero emission trucks through the generation of mobile source emission reduction credits that can be used by other entities for compliance with other SCAQMD rules. This control measure requires amending SCAQMD Rule 1612.1 – Mobile Source Credit Generation Pilot Program and/or Rule 1612 –

Credits for Clean On-Road Vehicles to provide greater flexibility for entities to initiate projects in order to accelerate the deployment of zero- and near-zero emission trucks in the Basin and Coachella Valley. The focus of these amendments would be to encourage the deployment of commercially available zero and near-zero emission trucks that do not receive or cannot receive public funding assistance.

Control measure MOB-14 seeks to develop a rule similar to the San Joaquin Valley Air Pollution Control District Rule 9610 to recognize emission reduction benefits associated with incentive programs. The proposed rule would need to be crafted to recognize the emission benefits resulting from incentive funding programs such as the Carl Moyer Memorial Air Quality Standards Attainment Program and Proposition 1B so that the emission reductions can be accounted for in the SIP. As previously mentioned, the U.S. EPA indicated that there are six general elements that need to be incorporated in a proposed rule in order for the reductions to be credited in the SIP.

Similar to control measure MOB-05, control measure ORLD-03 would also accelerate the penetration of zero and near-zero emission light-duty vehicles and, in addition, would promote in-use efficiency gains related to vehicle miles traveled (VMT) through the use of autonomous vehicles and advanced transportation systems. In particular, this control measure would provide additional incentives, beyond CARB's and the Bureau of Automotive Repair's Enhanced Fleet Modernization Program, for lower-income vehicle owners who replace their scrapped vehicles with cleaner, more fuel-efficient vehicles. Assuming incentive funding is the primary mechanism to achieve the scope of further technology deployment, funding would be required for approximately 70,000 to 85,000 vehicles per year over a seven-year period to achieve the anticipated emission reductions.

Control measure ORHD-05 would achieve NOx and GHG emission reduction goals through advanced clean technology and increasing the penetration of the first wave of zero-emission heavy-duty technology into applications that are well suited to its use. The source category includes Classes 3 through 7 heavy-duty delivery trucks operated within California that are used in last mile freight delivery applications. Most of the last mile delivery trucks are within vehicle classes 3 through 6 (10,000-26,000 pounds) and some are in the vehicle class 7 (26,001-33,000 pounds). Last mile delivery fleets are predominately used in urban areas to deliver freight from warehouses and distribution centers to its final point of sale or use (last mile delivery).

Control measure ORHD-08 would provide incentive funding to accelerate the penetration of zero and near-zero emission equipment beyond the rate of natural turnover achieved through implementation of the other proposed measures identified for on-road heavy-duty vehicles. This control measure would use existing incentive and other innovative funding programs to help increase the penetration of zero and near-zero heavy-duty trucks. Funding mechanisms would target technologies that meet or exceed an optional low-NOx standard through 2023, when implementation of a new federal low-NOx standard is expected to begin.

To evaluate potential air quality impacts from scrapping vehicles that may occur as a result of promulgating the aforementioned control measures into rules or regulations or providing incentive funding, the methodology in the following discussion is used. It should be noted that the actual number of vehicles scrapped would depend on the availability of incentive funding, actual number of vehicles scrapped instead of relocated outside the Basin, the number of vehicles scrapped at facilities within and outside the Basin, and the available capacity of legal scrapping facilities within the Basin to scrap vehicles.

During the development of Rule 1610, emissions associated with vehicle scrapping were estimated to be 0.088 pound of PM10 emissions per vehicle scrapped (SCAQMD, 1992). According to an internet search conducted on August 15, 2016, there are eight legal auto recycling facilities in the Basin (State of California Auto Dismantlers Association, 2016). Assuming that six vehicles can be crushed per hour (Martin, 2011) and facilities operate 10 hours per day, 480 vehicles can be crushed per day in the Basin (8 facilities x 6 cars/hour x 10 hours/day = 480 cars/day). Therefore, vehicle scrapping has the potential to generate 42 pounds of PM10 per day, which is less than the SCAQMD's operational significance threshold of 150 pounds per day. By applying the CEIDARS profile 900 ratio of 0.6 pound of PM2.5 per pound of PM10, 25 pounds per day of PM2.5 emissions would be generated, which is below the PM2.5 significance threshold of 55 pounds per day.

In addition to air quality impacts from vehicle scrapping, the installation of some types of add-on control devices have the potential to increase the overall vehicle emissions by a small amount. For example, add-on control devices, such as particulate filters installed onto off-road construction equipment, in some cases have resulted in increased fuel use, typically estimated at less than one percent, due to a decrease in fuel economy associated with this type of device. Therefore, there is a potential for an increase in emissions from increased fuel use. Control measures in the 2016 AQMP where add-on control devices may be used to reduce PM emissions include MOB-10, MOB-13, and OFFS-08. These three control measures involve further reducing emissions from off-road equipment and may involve installing particulate filters.

A qualitative evaluation of the potential for increased emissions from off-road mobile sources shows that other factors may minimize or offset potential emission increases from add-on control equipment. In the case of exhaust pollutants, Manufacturers of Emission Controls Association (MECA) reports that the use of oxidization catalysts to reduce PM10 emissions from diesel-fueled vehicles should not increase other exhaust pollutants. In fact, combining an oxidation catalyst with engine management techniques can be used to reduce NOx emissions from diesel engines. This is achieved by adjusting the engine for low NOx emissions, which is typically accompanied by increased CO, VOC, PM10, and PM2.5 emissions. An oxidation catalyst can be added to offset these increases, thereby lowering the exhaust levels for all of the pollutants. Often, the increases in CO, VOC, and PM10 can be reduced to levels lower than otherwise could be achieved. In fact, a system which uses an oxidation catalyst combined with proprietary ceramic engine coatings and injection timing retard can achieve significant NOx reductions (e.g., greater than 40 percent) while maintaining low PM10 and PM2.5 emissions (MECA, 1999). Therefore, no increases in pollutant emissions due to add-on controls on mobile sources is anticipated.

Control measures that may increase the use of SCRs, may generate potential adverse air quality impacts associated with the use of SCRs in diesel-fueled vehicles if this technology resulted in the increase of other exhaust pollutants at the expense of reducing PM10 and PM2.5 or a reduction in fuel economy. However, applying SCR to diesel-powered vehicles provides simultaneous reductions of NOx, PM10, PM2.5, and VOC emissions.

Like an oxidation catalyst, SCR promotes chemical reactions in the presence of a catalyst. However, unlike oxidation catalysts, a reductant is added to the exhaust stream in order to convert NOx to elemental nitrogen and oxygen in an oxidizing environment. The reductant can be ammonia but in mobile source applications, urea is normally preferred. As exhaust gases along with the reductant pass over the catalyst, 75 to 90 percent of NOx emissions, 50 to 90 percent of the VOC emissions, and 30 to 50 percent of the PM10 and PM2.5 emissions are reduced. SCR also reduces the characteristic odor produced by a diesel engine and the diesel smoke.

In the case of exhaust pollutants, the catalyst composition of SCR and its mode of operation are such that sulfates could form. However, with the use of ultra-low sulfur diesel fuel, which has been required for stationary and on-road applications since September 2006, sulfate formation is expected be negligible. In particular, even at temperatures exceeding 500 degrees Centigrade, only five percent of the sulfur in the fuel would be converted to sulfate, which still allows for significant net PM10 and PM2.5 emission reductions. Applying SCR to diesel-powered vehicles also provides simultaneous reductions of NOx, PM10, PM2.5, and VOC emissions.

As to a reduction in fuel economy, because of the large NOx reductions afforded by SCR, it is possible that low NOx emissions can be achieved with an actual fuel economy benefit. Compared to internal engine NOx abatement strategies like exhaust gas recirculation and timing retard, SCR offers a fuel economy benefit in the range of three to 10 percent as a result of being able to optimize engine timing for fuel economy and relying on the SCR system to reduce NOx emissions. Therefore, no significant adverse air quality impacts were identified from the use of particulate filters or SCRs in conjunction with ultra-low sulfur diesel fuel to potentially comply with the applicable control measures.

Control measures MOB-02 and ORFIS-01 would potentially accelerate the replacement of locomotive engines in freight service or employ add-on devices to meet the lower emission standard. As such, control measures MOB-02 and ORFIS-01 may generate air quality impacts from add-on devices. Therefore, the impacts of the replacement of locomotives and use of add-on devices are similar to those discussed for OFFRD-01. Similar to control measures MOB-10, MOB-13, and OFFS-08, locomotives are typically refurbished and a new engine installed so no scrapping of the locomotives are expected. Add-on devices, such as particulate filters have an increase in fuel use associated with the decrease in fuel economy associated with the type of add-on device, which is estimated to be less than one percent. Therefore, there is a potential for an increase in emissions from the increase in fuel use. However, the number of locomotives to be equipped with add-on devices versus replaced is not known. Therefore, quantification of the air quality impacts would be speculative.

Control measures MOB-01, MOB-02, MOB-04, MOB-05, MOB-06, MOB-07, MOB-09, MOB-10, MOB-13, MOB-14, EGM-01, ORLD-01, ORLD-03, ORHD-02, ORHD-04, ORHD-05, ORHD-06, ORHD-07, ORHD-08, ORHD-09, ORFIS-01, ORFIS-05, OFFS-04, OFFS-07, and OFFS-08 have the potential to increase the use of alternative fuels such as biodiesel, LNG, CNG, ethanol, and hydrogen. The availability of the producers of alternative fuels to meet the increase in demand has the potential for an increase in emissions associated with the increased production. Production of the alternative fuels such as LNG, CNG require little processing with less emissions than the production of refined petroleum products such as gasoline, diesel, and jet fuel. While biodiesel and ethanol production do require more processing than LNG and CNG, the production processes are less complicated than petroleum refining. Biodiesel is made from a catalytic chemical process similar to one or two processes in a typical refinery, which will have many units available to produce refined products from crude oil. Ethanol is produced by fermentation. Biodiesel and ethanol can be made from renewable sources such as vegetable oils, sugar cane, corn, and animal fats. Therefore, the production of alternative fuels, especially biofuels, typically generates less air emissions than a petroleum refinery would when producing similar gasoline or gasoline equivalent amounts. Any increase in emissions attributable to an increased production of alternative fuels would be offset by reduced levels of petroleum fuel production and transportation of crude oil primarily from overseas and possibly by rail, as diesel and gasoline demand decreases.

In general, the 2016 AQMP mobile source control measures are expected to result in emission reductions.

4.1.6.2.5 Impacts from Miscellaneous Sources

Miscellaneous source control measures would regulate a variety of different types of emission sources including both area and point sources. As a result, these control measures are expected to reduce a variety of VOC, criteria pollutant, and precursor emissions. However, the following control measures were identified as also having the potential to create adverse air quality impacts.

Control measure BCM-04 includes several strategies for reducing the pH level in manure. One strategy includes the application of acidifiers, such as sodium bisulfate (SBS). SBS is being considered for use in animal housing areas where high concentrations of fresh manure are located. Research indicates best results with the use of SBS on hot spots. SBS can also be applied to manure stock piles and at fence lines, and upon scraping manure as part of efforts to reduce ammonia spiking from the leftover remnants of manure and urine. In California, SBS has been used at dairies in Tulare, Fresno, Merced, Stanislaus, San Joaquin, Kings, Kern, San Bernardino, Riverside, San Benito, and Sacramento counties, mainly to prevent cow lameness and nuisance flies. Outside of California, SBS has also been used at dairies in Washington (Walla Walla, Columbia, and Whitman), Oregon (Wallowa), and Wisconsin.

Based on historical data, application of SBS may only be needed for eight weeks out of the year; hence, seasonal or episodic application of SBS may be effective when high ambient PM2.5 levels are of concern. Additional delivery truck trips would be required to deliver SBS and SBS may be applied by hand or by tractor.

Another strategy in control measure BCM-04 for reducing the pH level in manure would require increasing the cleaning frequency of the manure belt in laying hen houses from once every four days to once every two days. Doing so would also have the potential to reduce ammonia emissions by 45 percent. More frequent cleaning would be conducted when ambient PM2.5 concentrations are highest in the region. Although this strategy would increase vehicle trips to haul away the manure, the additional haul truck trips would not occur on the same days as haul truck trips are currently occurring. As result, haul truck trips are not expected to exceed baseline peak daily haul truck trip emissions.

Control measure BCM-04 is not expected to generate a substantial number of new vehicle trips on a peak day, if any, related to control requirements. Control Measure BCM-04 could require additional vehicle travel to deliver and apply acidifier. At this time, it is not known what control strategies may be applied, which facilities may require additional trips or how often these trips may be necessary. Therefore, no emission estimates could be prepared at this time. However, while these trips would be routine, they are not expected to be frequent.

Control measure BCM-08 would further reduce PM emissions from open burning sources. Based on burn permit acreage data from 2015, over 90 percent of agricultural burns are conducted within the Coachella Valley area (Salton Sea Air Basin) while a limited amount of agricultural burning continues to occur within the western Riverside/San Bernardino County portions of the Basin. Prescribed burns also occur on the northern and eastern boundaries of the Basin and are sometimes incorporated into fire suppression activities. Training burns occur throughout the region.

One approach for reducing emissions from burn sources could involve establishing an administrative fee as part of the burn permit program based on acreage or amount of material burned, to the extent these factors are related to efforts required for processing and enforcing. Fees would not be charged to producers using alternatives to burning. Another approach could involve providing incentives to agricultural producers, especially in peak PM2.5 areas, to implement alternatives to burning. Since BCM-08 provides incentives for alternatives to agricultural burns, BCM-08 would actually reduce emissions from agricultural burn operations.

Control measure BCM-08 identifies several alternatives to burning. Of the potential alternatives to burning, only chipping and grinding were identified as having the potential to generate adverse air quality impacts and these activities are subject to SCAQMD Rule 1133.1 – Chipping and Grinding Activities. The SCAQMD prepared an analysis in a CEQA document that evaluated the potential adverse environmental impacts from implementing Rule 1133.1 along with Rule 1133 – Composting and Related Operations – General Administrative Requirements, and Rule 1133.2 – Emission Reductions from Co-Composting Operations (SCAQMD, 2002). The analysis concluded that implementing all three of these rules would not generate significant adverse air quality impacts. Since Rule 1133.1 was a new rule at the time it was considered for adoption, the number of sources that were identified at the time as being subject to its requirements would likely far exceed the number of sources that would be subject to control measure BCM-08.

4.1.6.3 Toxic Air Contaminants

The air toxics control strategy in the 2016 AQMP contains a number of control measures specifically targeted at reducing TAC emissions from stationary sources. In addition, some criteria pollutant control measures will concurrently reduce air toxics while some air toxics control measures will reduce criteria pollutants. For example, mobile source control measures that result in replacing diesel engines with zero or near-zero emission equipment have the potential to reduce criteria pollutant emissions, as well as providing a co-benefit of reducing diesel PM emissions, which are considered to be carcinogenic.

One control measure, CMB-05, in the 2016 AQMP may result in the use of ammonia in SCRs. SCAQMD policy generally requires the use of 19 percent aqueous ammonia by volume for air pollution control equipment in order to avoid the greater hazards that are associated with the use of anhydrous ammonia and higher percentage concentrations of aqueous ammonia. Nonetheless, aqueous ammonia at 19 percent by volume can still create vapors, which are toxic and irritating to the eyes, nose, throat, and skin. Although aqueous ammonia has a low flammability rating, it is flammable under limited conditions. BACT for ammonia slip from SCR units is restricted to five ppm or less, which has been shown through source-specific permit modeling to have no significant toxic impact on surrounding communities.

In general, implementation of the 2016 AQMP control measures would be expected to reduce TAC emissions. The basis for this conclusion is that many TACs are also classified as VOCs and the 2016 AQMP includes some VOC control measures. To the extent that control measures reduce VOC emissions, it is expected that associated TAC emission reduction could also occur. Control measure CTS-01 is expected to reduce VOCs by reducing the solvent content of coatings, solvents, adhesives, and sealants. Concerns have been previously raised that reformulated products may be more hazardous than products formulated with conventional coatings.

Subchapter 4.3 includes an analysis that compares the potential replacement solvents that may be used in future formulations to conventional solvents. For example, if future compliant products are formulated with chemicals that may have new or different health hazards than are currently used, potentially significant adverse health hazard impacts could occur from using some low VOC reformulated products. However, as indicated in the discussion in Subsection 4.3.4.2, the physical and chemical properties such as flammability rating exposure ratings (threshold limit value (TLV), permissible exposure limit (PEL), immediately dangerous to life and health (IDLH), and health effects) of future coating formulations are generally less or no worse than conventional solvents overall. Further, many compliant future products are expected to be formulated with water, which tend to contain less flammable and less toxic materials than solvent-based coatings and products. Finally, as with the use of all chemicals, facilities and their workers would be required to continue to comply with existing health protective equipment and procedures when handling both flammable and toxic materials. Consequently, future reformulated coatings and solvents are not expected to increase exposures to TAC emissions.

FUG-01 is expected to result in reduced VOCs from fugitive emissions at oil and gas production facilities, petroleum and chemical products processing, storage and transfer facilities, marine terminals, and other sources by improving leak detection and repair requirements, thus providing an air quality benefit.

Some measures for motor vehicle and transportation source categories (MOB-01, MOB-02, MOB-04, MOB-07, MOB-10, MOB-12, MOB-13, MOB-14, ORHD-02, ORHD-04, ORHD-05, ORHD-06, ORHD-07, ORHD-08, ORHD-09, ORFIS-01, ORFIS-03, ORFIS-04, ORFIS-05, OFFS-01, OFFS-04, and OFFS-07) would reduce mobile source emissions, in particular, emissions of diesel particulate matter (DPM) from engine exhaust, which is a known carcinogen, as well as toxic components of gasoline such as benzene and 1,3-butadiene. These mobile source control measures would result in replacing existing vehicles or equipment with more efficient vehicles or equipment, zero emission electric vehicles or equipment, or alternative fueled vehicles or equipment. Combustion emissions of alternative fuels have trace amounts of methanol and aldehyde, but, generally, are considered to be cleaner and less toxic than diesel or gasoline fueled vehicles.

Emissions from power generating equipment may include trace amounts of benzene, aldehydes, metals, and polynuclear aromatic hydrocarbons. However, if the process being electrified was previously powered by direct combustion of fossil fuels, then electrification is expected to result in an overall decrease in toxic emissions.

Based upon the information in the preceding discussion, potential impacts associated with implementing the 2016 AQMP are expected to be an overall reduction in TAC emissions.

4.1.6.4 Greenhouse Gas Emissions

In September 2011, the SCAQMD Governing Board adopted the SCAQMD Air Quality-Related Energy Policy (AQREP). This policy integrates energy, air quality, and climate change by explaining how the current dependence upon fossil fuels for energy generation and consumption within the Basin results in the emission of criteria pollutants, toxic pollutants, and greenhouse gases (GHGs). The SCAQMD's AQREP articulates policies and actions to ensure clean air by promoting the development of reliable, safe, cost effective, and clean energy. Efforts to clean the air and meet mandated air quality standards, focused on the adoption of cleaner energy sources, also achieve the co-benefit of reducing GHG emissions, thus helping to meet state and global climate goals.

Any newly adopted programs, as well as those under development and included within the proposed 2016 AQMP, may have impacts on future energy usage in California that are not yet fully accounted for in future energy use projections. However, adopting the 2016 AQMP control measures would be expected to not only reduce criteria pollutant emissions, but would also provide co-benefits of reducing GHG emissions and increasing energy efficiency, along with renewable power sources. To the extent that 2016 AQMP control measures reduce or eliminate combustion processes in favor of near-zero or zero emission technologies, GHG emission reduction co-benefits would also be expected to occur. Table 4.1-4 qualitatively shows the GHG emission impacts of implementing 2016 AQMP control measures. The relative impacts (e.g., either an increase (+) or decrease (-)) are presented along with the activities associated with the impact (e.g., construction necessary to implement the control measure).

TABLE 4.1-4

Potential Impacts on Climate Change and Global Warming from Implementation of 2016 AQMP Control Measures

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	CONTROL MEASURE GHG IMPACT[(a)]
ECC-03	Additional Enhancements in Reducing Existing Residential Building Energy Use	Measure consists of incentives and promoting existing energy efficiency programs that would reduce criteria and GHG emissions.	+ (construction emissions) - (co-benefits from federal, state and local mandates and programs to reduce GHG emissions and increase energy efficiency)
ECC-04	Reduced Ozone Formation and Emission Reductions from Cool Roof Technology	Take credit for NOx and VOC emissions reductions which would occur due to compliance with required energy efficiency mandates and state regulations.	+ (construction emissions) - (reduction in emissions and energy use)
CMB-01	Transition to Zero- and Near-Zero Emission Technologies for Stationary Sources (NOx, VOC)	Incentivize transition to zero and near-zero emission technologies, specifically those in non-power plant combustion sources.	+ (construction, increased energy usage) - (reduction in conventional fuel combustion)
CMB-02	Emission Reductions from Commercial and Residential Space and Water Heating (NOx)	Installation of new commercial space heating furnaces boilers, water heaters, and space heating furnaces.	+ (construction) - (more efficient heaters)
CMB-03	Emission Reductions from Non-Refinery Flares (NOx)	Installation of newer flares implementing the best available control technology.	+ (construction) - (more efficient flares)
CMB-05	Further NOx Reductions from RECLAIM Assessment (NOx)	Re-examination of the RECLAIM program, including voluntary opt-out and the implementation of additional control equipment and SCR equipment	+ (construction, increased electricity usage from control equipment)
FLX-02	Stationary Source VOC Incentives (VOC)	Use of replacement coatings, such as UV cured resins and coatings, super-compliant/ultra-low emission technologies and electrification in the place of combustion based equipment.	+ (construction)
BCM-01	Further Emissions Reductions from Commercial Cooking (PM)	Installation of control equipment such as ESPs, filters, centrifugal separators, and misters.	+ (construction, increased energy usage from control equipment)
BCM-02	Emission Reductions from Cooling Towers (PM)	Installation of drift elimination technologies into cooling towers.	+ (construction)
BCM-04	Emission Reductions from Manure Management Strategies (NH3)	Acidifier application, manure removal, manure slurry injection, and dietary manipulation and feed additives to reduce ammonia in manure	+ (construction, control equipment)
BCM-05	Ammonia Emission Reduction from Nox Controls (NH3)	Installation and use of advanced catalyst technology for the conversion of ammonia	+ (construction)

TABLE 4.1-4 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	CONTROL MEASURE GHG IMPACT[(a)]
BCM-06	Emission Reductions from Abrasive Blasting Operations (PM)	Construction of portable, permanent or temporary enclosures with in-building abrasive blasting activities vented to fume extractors, and dust collectors with HEPA filters and the use of negative air machines.	+ (construction, increased electricity usage from control equipment)
BCM-07	Emission Reductions from Stone Grinding, Cutting, and Polishing Operations (PM)	Installation of engineering controls, such as exhaust ventilation with dust collectors, the use of wet methods like wet-wiping or wet sweeping, and vacuuming with a HEPA filter.	+ (construction, increased electricity usage from control equipment)
MOB-01	Emission Reductions at Commercial Marine Ports (NOx, SOx, CO)	Financial incentives for cleaner vessels, vehicles, and equipment to use alternative fuels or fuel additives.	+ (construction, increased energy usage) - (electrification, conversion to alternative fuels/additives, reduction in conventional fuel combustion emissions)
MOB-02	Emission Reductions at Rail Yards and Intermodal Facilities (NOx, PM)	Acceleration of the penetration of zero and near-zero emission locomotives and the use of alternative fuels and fuel additives.	+ (increased energy) - (electrification, conversion to alternative fuels/additives, reduction in conventional fuel combustion emissions)
MOB-03	Emission Reductions at Warehouse Distribution Centers (all pollutants)	Use of incentives, regulatory rules, and promotion of hybrid technologies to increase zero and near-zero emission equipment in/around warehouse.	+ (increased energy usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
MOB-04	Emission Reductions at Commercial Airports (all pollutants)	Incentivizing zero and near-zero technologies like alternative fuels, diesel PM filters, and low-emitting engines.	+ (increased energy usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
MOB-05	Accelerated Penetration of Partial-Zero and Zero Emissions Vehicles (VOC, NOx, CO)	Incentivizing the "Clean Vehicle Rebate Project" to promote the use of vehicles with zero and near-zero emissions.	+ (increased energy usage) - (electrification, conversion to alt fuels/reduction in conventional fuel combustion emissions)
MOB-07	Accelerated Penetration of Partial Zero and Zero Emission Light Heavy and Medium Heavy Duty Vehicles (NOx, PM)	Acceleration of the penetration of zero and near-zero emission vehicles as well as the use of alternative fuels and fuel additives.	+ (increased energy usage) - (electrification, conversion to alternative fuels/additives, reduction in conventional fuel combustion emissions)
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program (NOx, PM)	Incentivizing the use of zero emission technologies, the building of electric or magnetic power into roadway infrastructure to reduce emissions.	+ (construction, increased electricity usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)

TABLE 4.1-4 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	CONTROL MEASURE GHG IMPACT[(a)]
MOB-10	Extension of the SOON Provision for Construction/Industrial Equipment (NOx)	Incentivizing SOON program and phasing in vehicles that meet Tier 4 standards in place of older, high emitting equipment.	- (reduction in conventional fuel emissions)
MOB-13	Off-Road Mobile Source Emission Reduction Credit Generation Program (NOx, Sox, PM)	Acceleration of the penetration of zero and near-zero off-road mobile sources as well as the use of alternative fuels and fuel additives	+ (increased energy usage) - (electrification, conversion to alternative fuels/additives, reduction in conventional fuel combustion emissions)
MOB-14	Emissions Reductions from Incentive Programs	Implementation of the Prop 1B and Carl Moyer Programs to accelerate the penetration of clean air vehicles.	- (reduction in conventional fuel emissions)
EGM-01	Emission Reductions from New Development or Redevelopment Projects (all pollutants)	Accelerating the penetration of zero and near-zero emission technologies in new or redevelopment projects, and the use of things like dust control, alternative fuels, diesel PM filter, and low-emitting engines.	+ (increased energy usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
TXM-01	Control of Metal Particulate from Metal Grinding Operations (TACs, PM)	Construction of enclosures and control equipment such as exhaust ventilation with dust collectors, use of wet methods like wet-wiping or wet sweeping to prevent dust release and other measures like vacuuming with a HEPA filter.	+ (construction, increased electricity usage from control equipment)
TXM-02	Control of Toxic Metal Particulate Emissions from Plating and Anodizing Operations (TACs, PM)	Modification of existing equipment, construction of enclosures and control equipment, such as exhaust ventilation with dust collectors, and the implementation of new measures like vacuuming with a HEPA filter and wet-wiping to prevent dust emission.	+ (construction, increased electricity usage from control equipment)
TXM-04	Control of Toxic Metal Particulate Emissions from Soil Decontamination (TACs, PM)	Construction and operation of chemical treatment, barriers, tire and wheel knockout and cleaning stations, and other dust suppression techniques.	+ (construction)
TXM-05	Control of Toxic Metal Particulate Emissions from Laser Plasma Cutting (TACs, PM)	Construction of enclosures and control equipment, such as HEPA filters.	+ (construction, increased electricity usage from control equipment)
TXM-06	Control of Toxic Emissions from Metal Melting Facilities (TACs, PM)	Construction of enclosures and control equipment, such as exhaust ventilation with filters/baghouses, and the implementation of methods to prevent dust release including wet-wiping and vacuuming with HEPA filters.	+ (construction, increased electricity usage from control equipment)

TABLE 4.1-4 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	CONTROL MEASURE GHG IMPACT[(a)]
TXM-07	Control of Lead Emissions from Stationary Sources (TACs, PM)	Construction and implementation of control equipment, including baghouses and HEPA filters and the use of best management practices, to minimize lead emissions.	+ (construction, increased electricity usage from control equipment)
TXM-08	Control of Emissions from Chemical Stripping of Cured Coatings (Methylene Chloride)	Reformulation of solvents and use of activated carbon in carbon adsorbers.	+ (construction, increased electricity usage from control equipment)
TXM-09	Control of Toxic Emissions from Oil and Gas Productions (TACs, PM)	Construction of enclosures and control equipment and implementation of methods to prevent dust release such as wet-wiping and vacuuming with a HEPA filter.	+ (construction, increased electricity usage from control equipment)
ORLD-01	Advanced Clean Cars 2 (NOx, ROG)	Expanded/new standards for clean cars to increase zero and near-zero emission vehicles which could include the use of alternative fuels.	+ (increased energy usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
ORLD-03	Further Deployment of Cleaner Technology: On-Road Light-Duty Vehicles (NOx, ROG)	Acceleration of the penetration of zero and near-zero emission vehicles, including those vehicles that use alternative fuels and fuel additives.	+ (increased energy usage) - (electrification, conversion to alternative fuels/additives, reduction in conventional fuel combustion emissions)
ORHD-02	Low-NOx Engine Standards (Nox)	Implementation of technologies to reduce emissions from heavy duty engines including the use of alternative fuels and fuel additives.	+ (increased energy usage) - (electrification, conversion to alternative fuels/additives, reduction in conventional fuel combustion emissions)
ORHD-04	Advanced Clean Transit (NOx, ROG)	Implementation of technologies to accelerate the penetration of zero and near-zero emission buses into the fleet, including the use of alternative fuels.	+ (increased energy usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
ORHD-05	Last Mile Delivery (NOx, ROG)	Acceleration of the penetration of zero and near-zero emission last mile delivery trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	+ (construction, increased electricity usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
ORHD-06	Innovative Technology Certification Flexibility (NOx)	Acceleration of the penetration of zero and near-zero emission heavy duty trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	+ (construction, increased electricity usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)

TABLE 4.1-4 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	CONTROL MEASURE GHG IMPACT[(a)]
ORHD-07	Zero Emission Airport Shuttle Buses (NOx, ROG, PM2.5)	Implementation of technologies to accelerate the penetration of zero and near-zero emission airport shuttles, including the use of alternative fuels.	+ (increased energy usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
ORHD-08	Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission heavy duty vehicle engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	+ (construction, increased electricity usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
ORHD-09	Further Development of Cleaner Technology: On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	+ (construction, increased energy usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
ORFIS-01	More Stringent National Locomotive Standards (NOx, ROG)	Use of Tier 5 control equipment such as SCRs, alternative fuels, DPM filters and electric batteries.	+ (construction, increased energy usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
ORFIS-03	Incentivize Low Emission Efficient Ship Visits (NOx, PM)	Incentives for the use of control equipment such as SCRs.	+ (construction, increased electricity usage from control equipment)
ORFIS-04	At-Berth Regulation Amendments (NOx, ROG)	Further reduce emissions from ships at berth and advance the use of near-zero and zero emission technologies	+ (construction, increased electricity usage)
ORFIS-05	Further Development of Cleaner Technology: Off-Road Federal and International Sources (NOx, ROG)	Measure to accelerate deployment of cleaner marine, rail and aircraft off-road technology by increasing incentive program.	+ (construction, increased electricity usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
OFFS-01	Zero-Emission Off-Road Forklift Regulation Phase 1 (NOx, ROG)	Measure to accelerate the penetration of zero emission technologies to be used in off-road forklifts.	+ (construction, increased electricity usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
OFFS-04	Zero-Emission Airport Ground Support Equipment (NOx, ROG, PM2.5)	Measure to accelerate the penetration of zero emission technologies to be used in airport ground support equipment.	+ (construction, increased electricity usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)

TABLE 4.1-4 (concluded)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	CONTROL MEASURE GHG IMPACT[(a)]
OFFS-05	Small Off-Road Engines (NOx, ROG)	Measure to accelerate the penetration of zero emission technologies to be used in small off-road engines.	+ (construction, increased electricity usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
OFFS-06	Transport Refrigeration Units Used For Cold Storage (NOx, ROG, GHG)	Measure to accelerate penetration of zero emission technologies in cold store refrigeration unites.	+ (construction, increased electricity usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
OFFS-07	Low Emission Diesel Requirement (NOx, PM)	Reformulation of diesel fuel to lower emissions.	+ (construction, increased energy usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)
OFFS-08	Further Deployment of Cleaner Technologies: Off-Road Equipment (NOx, ROG, PM2.5)	Measure to accelerate the implementation of zero emission technologies in off-road equipment.	+ (construction, increased electricity usage) - (electrification, conversion to alternative fuels, reduction in conventional fuel combustion emissions)

(a) + Control measure is expected to result in an increase in GHG emissions
- \- Control measure is expected to result in a decrease in GHG emissions

Because of the qualitative nature of Table 4.1-4, it is not possible to show the magnitude of GHG emission effects from implementing 2016 AQMP control measures. For example, a positive effect (i.e., a GHG emission increase) for one control measures may be substantially less than the positive GHG emission effect of a different control. Many of the sources affected by the 2016 AQMP may already be required to control emissions, and any increase in construction emissions may simply involve the removal and replacement of existing filters, catalysts, and carbon (for adsorbers) with more efficient components. As a result, construction emissions associated with these activities would be less than if an entirely new control technology is installed. Further, the GHG effects shown in Table 4.1-4 likely overestimate GHG emissions from some stationary source control measures because, instead of increasing GHG emissions, they may actually result in reducing GHG emissions from combustion because more efficient types of control equipment would likely be installed. Finally, replacing older control equipment with new control equipment would likely result in a reduction in electricity demand and usage because newer equipment tends to be more efficient than older equipment.

Of the total fuel used in the Basin, transportation sources account for over 50 percent of in-Basin use. These sources are also the main contributors to NOx emissions. Within the transportation sector, diesel-powered sources emit the majority of NOx. With regard to mobile source control measures, increasing the penetration of electric vehicles or alternative fueled vehicles into fleets regulated by SCAQMD may produce emissions from increased electricity generation. However, the net effect of removing gasoline and diesel mobile sources is expected to have greater overall emission reduction benefits because emissions from electricity generation needed to power one electric vehicle are much less than the combustion emissions from one gasoline or diesel vehicle, including for GHGs.

Implementing the 2016 AQMP control measures is expected to reduce GHG emissions consistent with the AB32 scoping plan. Compared to the 2014 baseline, energy demand from 2016 AQMP control measures is expected to increase by 10,227 GWh, a 7.8 percent increase, by the year 2023 and produce 3.4907 million metric tons (MMT) of GHG emissions. Similarly, compared to the 2014 baseline, energy demand from 2016 AQMP control measures is expected to increase by 18,029 GWh, a 12.7 percent increase, by the year 2031 and produce 6.1496 MMT of GHG emissions.

Concurrent with projected increases in electricity demand and associated emissions from implementing 2016 AQMP mobile source control measures is a reduction in the use of petroleum fuels and their associated emissions. Control measures for which the reduction in petroleum fuels can be quantified are shown in Table 4.1-5.

As shown in Table 4.1-5, by milestone year 2023, implementing 2016 AQMP mobile source control measures has the potential to reduce total annual petroleum fuel use by approximately 530 million gallons. By milestone year 2031, total annual petroleum fuel use is expected to reduce by approximately 870 million gallons.

Using a CO2 emission factor of 8.78 kg/gal for gasoline and a CO2 emission factor of 10.05 kg/gal the GHG emission reductions can be calculated for both gasoline and diesel for each milestone year. As shown in Table 4.1-6, in both milestone years 2023 and 2031, the net effect of implementing the 2016 AQMP control measures while concurrently reducing petroleum fuel use from mobile sources is expected to result in an overall reduction of GHG emissions.

TABLE 4.1-5

Estimated Reduction in Petroleum Fuel Usage

CONTROL MEASURE NO.	CONTROL MEASURE DESCRIPTION	VEHICLE CLASS INCLUDED	ESTIMATED INCREASE IN VEHICLES		ESTIMATED FUEL DISPLACEMENT (GAL/YEAR)	
			2023	2031	2023	2031
MOB-05, MOB-14, ONLD-01, and ORLD-03	Accelerated Penetration of Partial-Zero and Zero Emission Vehicles	EMFAC: Light-Duty Automobiles, Light-Duty Trucks	357,000	714,000	161,088,494	241,517,781
ORHD-04	Advanced Clean Transit, Accelerated Penetration of Partial-Zero and Zero Emission Buses	EMFAC: Urban Buses	11,000	~~11,000~~	88,902,832	77,251,722
MOB-06, MOB-07, MOB-08, ORHD-03, ORHD-04, ORHD-05, ORHD-06, ORHD-08	Accelerated Penetration of Partial-zero and Zero Emissions Light, Medium and Heavy-Duty Trucks	EMFAC: Light Heavy-Duty Trucks, Medium-Duty Vehicles, Heavy-Duty Trucks, T6 Category Trucks, T7 Category Trucks	115,000	245,000	135,824,593	256,266,318
MOB-01, MOB-02, MOB-03, MOB-04, OFFS-01, OFFS-04, OFFS-06	Accelerate the Penetration of Zero Emission TRUs, Forklifts and Ground Support Equipment	OFFROAD: Ground Support	50,000	100,000	49,113,693	106,056,813
OFFS-02, OFFS-08	Further Deployment of Cleaner Technologies for Larger Off-Road Diesel/Gasoline Equipment	OFFROAD: Construction and Mining	30,000	60,000	57,095,698	114,191,396
MOB-10, OFFS-03, OFFS-08	Penetration of Zero Emission Off-Road Construction and Industrial Equipment	OFFROAD: Construction and Mining	20,000	40,000	38,063,799	75,187,576
Totals			583,000	1,170,000	530,089,109	870,471,606

Note: Based on EMFAC2014 emissions for 2023 and 2031 and OFFROAD emissions for 2023 and 2029. Fuel use scaled by population. Assumes diesel fuel (7 lb/gal density) for all OFFROAD applications.

TABLE 4.1-6

Estimated GHG Emission Impacts from 2016 AQMP Control Measures

Description	2023 CO_{2eq} Emissions(a) (million metric tons)	2031 CO_{2eq} Emissions(a) (million metric tons)
Increased Electricity(b)	3.4907	6.1496
Change in Gasoline Use	-2.9766	-3.1238
Change in Diesel Use	-4.2970	-3.4305
Net Change in Emissions	-3.7829	-0.4047

(a) Source: Emission factors are from CARB, et al., 2010.
(b) Electricity generation is weighted by population in the LADWP and SCE service areas.
Negative numbers represent emission reductions.

Control Measures ECC-03, CMB-01, CMB-02, CMB-03, CMB-05, FLX-02, BCM-01, BCM-02, BCM-04, BCM-05, BCM-06, BCM-07. MOB-01, MOB-09, MOB-14, TXM-01, TXM-02, TXM-04, TXM-05, TXM-06, TXM-07, TXM-08, TSM-09, ORHD-05, ORHD-06, ORHD-08, ORHD-09, ORFIS-01, ORFIS-03, ORFIS-04, ORFIS-05, OFFS-01, OFFS-04, OFFS-05, OFFS-06, OFFS-07, and OFFS-08 are expected to have GHG emissions associated with construction. SCAQMD policy regarding GHG emissions from construction is to amortize construction emissions over a 30-year timeframe and add the result to operational emissions. Implementing the 2016 AQMP control measures results in operational GHG emissions reductions, which reductions exceed the increase in GHG emissions resulting from construction activities, as amoritized over 30 years. Thus, increased GHG emissions from construction is not expected to generate significant adverse GHG impacts.

Some of the 2016 AQMP control measures have the potential to increase energy demand by implementing control measures that would use electricity to power add-on control devices or power catenary systems for fixed-route mobile sources. Projects involving catenary systems would reduce diesel combustion emissions. As with the on-road control measures discussed previously, converting from diesel-fired sources to electricity generated by primarily natural gas, GHG emissions are expected to decrease. Further, add-on control devices are designed and sized for the specific source that is being controlled, so the additional increase in electricity demand will be highly variable from source to source. The electricity needed to power these control measures is expected to be provided by public utility companies. Existing power generating facilities are subject to AB-32 and will be required to reduce GHG emissions by 2020 and any future power generating stations would be subject to stringent emission control requirements, including GHG emissions. Therefore, the need for additional electricity generation in order to provide power to operate the projected add-on control devices and catenary systems is not expected to generate significant adverse GHG emissions, after taking into account the reductions expected to result from the decreased use of gasoline and diesel fuels.

The 2016 AQMP control measures have the potential to increase the use of alternative fuels. Alternative fuels generally generate less or equivalent GHG emissions when combusted compared to gasoline and diesel. For example, in on-road vehicles, the use of biodiesel, electricity, E85 (ethanol), CNG, LPG, and LNG results in less or equivalent GHG emissions when compared to gasoline (Argonne, 2016). The use of fossil fuel-based CNG in on-road motor vehicles has approximately the same carbon footprint as gasoline or diesel. However, the use of renewable CNG (generated from biogas) has only about 20 percent of the carbon footprint when compared to gasoline (18.4 percent) and diesel (21.7 percent). The use of fossil fuel-based CNG in off-road equipment is approximately twice the carbon footprint of gasoline and approximately 50 percent more than diesel. The use of renewable CNG in off-road equipment only has about half the carbon footprint of gasoline (44.1 percent) and one-third of the carbon footprint of diesel (29.2 percent) (Argonne, 2016).

The use of electricity or other alternative fuels such as E85, and LNG results in less GHG emissions than diesel fuel. In on-road applications and small off-road equipment (forklifts), LPG generates less or approximately the same amount of GHG emissions as gasoline or diesel. However, LPG generates approximately double the GHG emissions of gasoline (218 percent) or diesel (144 percent) in heavy off-road applications (Argonne, 2016). Unlike biodiesel and electricity, other alternative fuels such as E85, CNG, or LNG, LPG cannot be generated from a renewable resources to reduce these effects.

Hydrogen can be used in gaseous or liquid form. In the gaseous form, hydrogen generates less or equivalent GHG emissions when combusted as compared to gasoline or diesel. In liquid form, hydrogen generates more GHG emissions than gasoline or diesel (Argonne, 2016).

The 2016 AQMP provides incentives to increase the penetration of zero emission and partial zero emission vehicles. The priority for incentives will be zero emission vehicles to provide the largest emission reductions. Zero emission vehicles are currently available in the form of electric vehicles and are expected to be the primary choice for compliance as they are already popular and commercially available today, and do not require significant progress in the development of new technologies, as would be the case with other alternative fuels (e.g., hydrogen fuel cells).

Alternative fueled vehicles, such as LPG-fueled vehicles are not commonly used today. Further, most (if not all) LPG-fueled vehicles are dual fueled vehicles in that they operate on both LPG and gasoline, so the emissions reductions are not as great as they would be if 100 percent of LPG or other alternative fuel were used instead. Therefore, AQMP incentives for these types of vehicles are not expected. Further, cleaner off-road equipment is likely to transition to a higher tier emission standard or commercially available battery-electric or fuel cell operated and the use of fossil fuel, LPG, or CNG is not expected to be incentivized as part of the 2016 AQMP.

Similarly, the availability and popularity of hydrogen vehicles in California is very limited. There are only 331 registered vehicles in the California (CARB, 2016), therefore, the use of hydrogen as an alternative fuel is not expected to be substantial as part of the 2016 AQMP incentives.

Because electric vehicles are commercially available and in wide use today, substantial infrastructure has already been developed such as charging stations along major highways. Infrastructure for other alternative fuels (e.g., hydrogen, CNG, LPG, etc.) is not as readily available as electricity. As shown in Table 3.3-3, 69 percent of available alternative fuel stations are electric, followed by CNG at 12 percent. Therefore, while other alternative fuels may be used, it is expected that electricity will be the predominant alternative fuel in the future.

Based on the above analysis, electricity is expected to be the predominant alternative fuel because it is more available, affordable, and can be used to power zero emission vehicles. As a result, GHG emissions associated with the use of alternative fuels are expected to be less than GHG emissions associated with the use of petroleum-based fuels. Therefore, no increase in GHG emissions is expected from the increased production and use of alternative fuels and GHG emission impacts are expected to be less than significant.

4.1.7 MITIGATION MEASURES

Based on the analysis above, implementation of the 2016 AQMP will result in less than significant impacts to operational air quality and GHG. However, construction air quality impacts from implementing 2016 AQMP control measures are concluded to be potentially significant. As a result, mitigation measures are required in order to minimize the significant air quality impacts associated with implementing 2016 AQMP control measures. The following mitigation measures should be implemented, where applicable and if feasible:

AQ-1 During construction, require the use of 2010 and newer diesel haul trucks (e.g., material delivery trucks and soil import/export). If the Lead Agency determines that 2010 model year or newer diesel trucks cannot be obtained, the Lead Agency shall instead requires the use of trucks that meet EPA 2007 model year NOx emissions requirements.

AQ-2 Require all on-site construction equipment to meet the following:

- All off road diesel-powered construction equipment greater than 50 hp shall meet the Tier 4 emission standards, where available. In addition, all construction equipment shall be outfitted with BACT devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations.
- A copy of each unit's certified tier specification, BACT documentation, and CARB or SCAQMD operating permit shall be provided at the time of mobilization of each applicable unit of equipment.
- Encourage construction contractors to apply for SCAQMD "SOON" funding incentives. The "SOON" program provides funds to accelerate the clean up of off-road diesel vehicles, such as heavy duty construction equipment. More information on this program can be found at the following website: http://www.aqmd.gov/tao/Implementation/SOONProgram.htm.

AQ-3 Prohibit vehicles and construction equipment from idling longer than five minutes at the construction site by including these restrictions in the construction company contract(s) and by posting signs on-site, unless the exceptions in the CARB regulations which pertain to idling requirements are applicable.

AQ-4 All on-road heavy-duty diesel trucks or equipment with a gross vehicle weight rating (GVWR) of 19,500 pounds or greater shall comply with EPA 2007 on-road emission standards for PM and NOx (0.01 gram per brake horsepower - hour (g/bhp-hr) and at least 0.2 g/bhp-hr, respectively).

AQ-5 Maintain construction equipment tuned up and with two to four-degree retard diesel engine timing or tuned to manufacturer's recommended specifications that optimize emissions without nullifying engine warranties.

AQ-6 The project proponent shall survey and document the proposed project's construction areas and identify all construction areas that are served by electricity. Onsite electricity, rather than temporary power generators, shall be used in all construction areas that are demonstrated to be served by electricity.

AQ-7 Provide temporary traffic controls such as a flag person, during all phases of significant construction activity to maintain smooth traffic flow.

AQ-8 Provide dedicated turn lanes for the movement of construction trucks and equipment on- and off-site.

AQ-9 Re-route construction trucks away from congested streets or sensitive receptor areas.

AQ-10 Improve traffic flow by signal synchronization.

AQ-11 Reduce traffic speeds on all unpaved roads to 15 mph or less.

AQ-12 Prohibit truck idling in excess of five minutes, on- and off-site.

AQ-13 Schedule construction activities that affect traffic flow on the arterial system to off-peak hours to the extent practicable.

AQ-14 Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 mph.

AQ-15 Suspend all construction activities that generate air pollutant emissions during first stage smog alerts.

AQ-16 Configure construction parking to minimize traffic interference.

AQ-17 Use alternative clean fueled off-road equipment or give extra points in the bidding process for contractors committing to use such equipment.

AQ-18 Require covering of all trucks hauling dirt, sand, soil, or other loose materials.

AQ-19 Install wheel washers where vehicles enter and exit the construction site onto paved roads or wash off trucks and any equipment leaving the site for each trip.

AQ-20 Apply non-toxic soil stabilizers according to manufacturers' specifications to all inactive construction areas (previously graded areas inactive for ten days or more).

AQ-21 Replace ground cover in disturbed areas as quickly as possible to minimize dust.

AQ-22 Pave road and road shoulders.

AQ-23 Sweep streets at the end of the day with SCAQMD Rule 1186 and 1186.1 compliant sweepers if visible soil is carried onto adjacent public paved roads (recommend water sweepers with reclaimed water).

As improved emission reduction technologies become available and as specific control measures are developed and projects proposed, construction mitigation measures will be updated and implemented. Further, future projects that implement 2016 AQMP control measures, including promulgating control measures such as SCAQMD rules or regulations or individual projects that implement the requirements of such promulgated rules where subsequent CEQA construction analyses have been performed, shall rely upon the results of these subsequent CEQA analyses, including whether or not mitigation measures will continue to be required.

4.1.8 IMPACTS AFTER MITIGATION

The 2016 AQMP would result in a reduction of criteria pollutants in the Basin, thereby attaining the air quality standards. Additionally, during operation, less than significant air quality and GHG impacts are anticipated. However, significant adverse construction air quality and GHG impacts could be caused by the proposed project. Implementation of the construction mitigation measures would reduce construction emissions but the overall construction air quality and GHG impacts after mitigation would likely remain significant.

4.2 ENERGY

4.2.1 INTRODUCTION

This subchapter examines impacts on the supply and demand of energy sources from implementing the proposed control measures in the 2016 AQMP. All control measures in the 2016 AQMP were evaluated to determine whether they could generate direct or indirect energy impacts based on the anticipated methods of control. Some of the control measures would require increased energy use. For example, the increased penetration of zero emission mobile sources will require additional electricity to be generated even though the use of conventional fuels will be reduced. Other control measures would alter the type of energy used such as switching from using gasoline or diesel fuels to using alternative fuels instead.

The NOP/IS for the 2016 AQMP (see Appendix A) identified the following activities associated with implementing the proposed control measures as having potentially significant energy impacts: 1) potential increase in electricity demand due to increase penetration of near-zero and zero emission technologies; 2) potential increase in natural gas demand; 3) potential increase in electricity demand associated with operating new control equipment; and 4) potential increase in the use of alternative fuels. Project-specific and cumulative energy impacts associated with increased electricity demand, increased natural gas demand, and increased use of alternative fuels are evaluated in this Program EIR.

4.2.2 2016 AQMP CONTROL MEASURES WITH POTENTIAL ENERGY IMPACTS

The 2016 AQMP strategy will further incentivize the penetration of partial-zero and zero emission technologies and these incentives would increase the demand for electricity. In addition, some types of control equipment would need electricity to operate and thus cause an increase the demand for electricity. Similarly, increased demand for natural gas could be required for combustion devices, especially for generating electricity. Finally, alternative fuels could be used as substitutes for gasoline and diesel for mobile sources. Each control measure proposed in the 2016 AQMP was evaluated and 47 control measures were identified as having potential adverse energy impacts. Evaluation of the control measures was based conducting an examination of the potential impacts for each control measure and the technologies that may be involved in light of current energy trends. All control measures were analyzed to identify both beneficial effects (energy conserving) and adverse impacts (energy consuming). Table 4.2-1 contains a summary of the 2016 AQMP control measures which may result in the use of compliance options that in turn, could generate significant energy impacts.

TABLE 4.2-1

Control Measures with Potential Energy Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	ENERGY IMPACTS
CMB-02	Emission Reductions from Commercial and Residential Space and Water Heating (NOx)	Installation of new commercial space heating furnaces, boilers, water heaters, and residential space heating furnaces.	Potential change in the type and amount of fuel combusted due to increased efficiencies.
CMB-05	Further NOx Reductions from RECLAIM Assessment (NOx)	Re-examination of the RECLAIM program, including voluntary opt-out and the implementation of additional control equipment and SCR/SNCR equipment.	Potential increased demand for electricity to operate the new control equipment.
FLX-02	Stationary Source VOC Incentives	Use of replacement coatings, such as UV cured resins and coatings, super-compliant/ultra-low emission technologies and electrification replacing combustion-based equipment.	Electrification in the place of combustion-based equipment may potentially increase the amount of electricity needed.
BCM-01	Further Emission Reductions from Commercial Cooking (PM)	Installation of control equipment such as ESPs, filters, centrifugal separators, and misters.	Potential increased demand for electricity to operate the new control equipment.
BCM-04	Emission Reductions from Manure Management Strategies (NH3)	Acidifier application, manure removal, manure slurry injection, and dietary manipulation and feed additives to reduce ammonia in manure	Potential increased demand for fuel used and fuel generated by poultry manure thermal gasification.
BCM-05	Ammonia Emission Reduction from NOx Controls (NH3)	Installation and use of advanced catalyst technology for the conversion of ammonia.	Potential increased demand for electricity to operate the control equipment.
BCM-06	Emission Reductions from Abrasive Blasting Operations (PM)	Construction of exhaust ventilation with a fabric filter for permanent use in building abrasive blasting activities and the use of additional portable equipment like negative air machines, fume extractors, and dust collectors with HEPA filters.	Potential increased demand for electricity to operate the control equipment.
BCM-07	Emission Reductions from Stone Grinding, Cutting, and Polishing Operations (PM)	Installation of engineering controls, such as exhaust ventilation with dust collectors, the use of wet methods like wet-wiping or wet sweeping, and vacuuming with a HEPA filter.	Potential increased demand for electricity due to the use of engineering controls.

TABLE 4.2-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	ENERGY IMPACTS
BCM-09	Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves (PM)	Construction/upgrading of wood burning hearths to cleaner hearth as well as an increase in the stringency of the curtailment program and education.	Potential increased demand for natural gas or electricity needed due to converting wood burning hearths to natural gas or electric hearths.
BCM-10	Emission Reductions from Greenwaste Composting (NH3, VOC)	Use of control such as anaerobic digestion and organic processing technology and restrictions for direct applications of un-composted waste to public lands.	Potential increased demand for natural gas needed for anaerobic digestion.
MOB-01	Emission Reductions at Commercial Marine Ports (NOx, SOx, CO)	Financial incentives for cleaner vessels, vehicles, and use of alternative fuels or fuel additives at marine ports.	Potential increased demand for natural gas, electricity, and alternative fuels/additives.
MOB-02	Emission Reductions at Rail Yards and Intermodal Facilities (NOx, PM)	Acceleration of the penetration of zero and near-zero emission locomotives and the use of alternative fuels and fuel additives.	Potential increased demand for natural gas, electricity, and alternative fuels/additives.
MOB-03	Emission Reductions at Warehouse Distribution Centers (all pollutants)	Use of incentives, regulatory rules, and promotion of hybrid technologies to increase zero and near-zero emission equipment in/around warehouses.	Potential increased demand for natural gas, electricity, and alternative fuels.
MOB-04	Emission Reductions at Commercial Airports (all pollutants)	Incentivizing zero and near-zero technologies like alternative fuels, diesel PM filters, and low-emitting engines.	Potential increased demand for natural gas, electricity, and alternative fuels.
MOB-05	Accelerated Penetration of Partial-Zero and Zero Emissions Vehicles (VOC, NOx, CO)	Acceleration of the penetration of zero and near-zero emission vehicles; use of alternative fuels and fuel additives.	Potential increased demand for natural gas, electricity, and alternative fuels/additives.
MOB-07	Accelerated Penetration of Partial-Zero and Zero Emission Light Heavy and Medium Heavy Duty Vehicles (NOx, PM)	Acceleration of the penetration of zero and near-zero emission vehicles as well as the use of alternative fuels and fuel additives.	Potential increased demand for natural gas, electricity, and alternative fuels/additives.
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program (NOx, PM)	Incentivizing the use of zero emission technologies, the building of electric or magnetic power into roadway infrastructure.	Potential increased demand for natural gas, electricity, and alternative fuels.
MOB-10	Extension of the SOON Provision for Construction/Industrial Equipment (NOx)	Incentivizing SOON program and phasing in vehicles that meet Tier 4 standards in place of older, high emitting equipment.	Potential increased demand for natural gas, electricity, and alternative fuels.

TABLE 4.2-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	ENERGY IMPACTS
MOB-13	Off-Road Mobile Source Emission Reduction Credit Generation Program (NOx, SOx, PM)	Acceleration of the penetration of zero and near-zero off-road mobile sources as well as the use of alternative fuels and fuel additives	Potential increased demand for natural gas, electricity, and alternative fuels/additives.
MOB-14	Emissions Reductions from Incentive Programs (NOx)	Implementation of Prop 1B and Carl Moyer Programs to accelerate the penetration of clean air vehicles.	Potential increased demand for natural gas, electricity, and alternative fuels.
EGM-01	Emission Reductions from New Development or Redevelopment Projects (all pollutants)	Accelerating the penetration of zero and near-zero emission technologies in new or redevelopment projects, and the use of dust control, alternative fuels, diesel PM filters, low-emitting engines, low VOC materials and mitigation fees.	Potential increased demand for natural gas, electricity, and alternative fuels.
TXM-01	Control of Metal Particulate from Metal Grinding Operations (TACs, PM)	Construction of enclosures and control equipment such as exhaust ventilation with dust collectors, use of wet methods like wet-wiping or wet sweeping to prevent dust release and other measures like vacuuming with a HEPA filter.	Potential increase in electricity demand needed to operate control equipment.
TXM-02	Control of Toxic Metal Particulate Emissions from Plating and Anodizing Operations (TACs, PM)	Modification of existing equipment, construction of enclosures and control equipment, such as exhaust ventilation with dust collectors, and the implementation of new measures like vacuuming with a HEPA filter and wet-wiping to prevent dust emission.	Potential increase in electricity demand needed to operate control equipment.
TXM-04	Control of Toxic Metal Particulate Emissions from Contaminated Soil (TACs, PM)	Construction and operation of enclosures and control equipment, such as HEPA filters, and wet methods to prevent dust release.	Potential increase in electricity demand needed to operate control equipment.
TXM-05	Control of Toxic Metal Particulate Emissions from Laser Plasma Cutting (TACs, PM)	Construction of enclosures and control equipment, such as HEPA filters.	Potential increase in electricity demand needed to operate control equipment.

TABLE 4.2-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	ENERGY IMPACTS
TXM-06	Control of Toxic Emissions from Metal Melting Facilities (TACs, PM)	Construction of enclosures and control equipment, such as exhaust ventilation with filters/baghouses, and the implementation of methods to prevent dust release including wet-wiping and vacuuming with HEPA filters.	Potential increase in electricity demand needed to operate control equipment.
TXM-07	Control of Lead Emissions from Stationary Sources (TACs, PM)	Construction and implementation of control equipment to minimize lead emissions as well as the use of best management practices.	Potential increase in electricity demand needed to operate control equipment.
TXM-08	Control of Emissions from Chemical Stripping of Cured Coatings (Methylene Chloride)	Reformulation of solvents and use of activated carbon.	Potential increase in electricity demand needed to operate control equipment.
TXM-09	Control of Toxic Emissions from Oil and Gas Well Activities (TACs, PM)	Construction of enclosures and control equipment and implementation of methods to prevent dust release such as wet-wiping and vacuuming with a HEPA filter.	Potential increased demand in electricity needed to operate control equipment.
ORLD-01	Advanced Clean Cars 2 (NOx, ROG)	Expanded/new standards for clean cars to increase zero and near-zero emission vehicles which could include the use of alternative fuels.	Potential increased demand for electricity, natural gas, and alternative fuels; reduced demand for gasoline and diesel fuels.
ORLD-03	Further Deployment of Cleaner Technology: On-Road Light-Duty Vehicles (NOx, ROG)	Acceleration of the penetration of zero and near-zero emission vehicles, including those vehicles that use alternative fuels and fuel additives.	Potential increased demand for electricity, natural gas, and alternative fuels/additives; reduced demand for gasoline and diesel fuels.
ORHD-02	Low-NOx Engine Standards (NOx)	Implementation of technologies to reduce emissions from heavy duty engines including the use of alternative fuels and fuel additives.	Potential increased demand for electricity, natural gas, and alternative fuels/additives; reduced demand for gasoline and diesel fuels.
ORHD-04	Advanced Clean Transit (NOx, ROG)	Implementation of technologies to accelerate the penetration of zero and near-zero emission buses into the fleet, including the use of alternative fuels.	Potential increased demand for electricity, natural gas, and alternative fuels; reduced demand for gasoline and diesel fuels.
ORHD-05	Last Mile Delivery (NOx, ROG)	Acceleration of the penetration of zero and near-zero emission last mile delivery trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential increased demand for electricity, natural gas, and alternative fuels; reduced demand for gasoline and diesel.

TABLE 4.2-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	ENERGY IMPACTS
ORHD-06	Innovate Technology Certification Flexibility (NOx)	Acceleration of the penetration of zero and near-zero emission heavy duty trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential increased demand for electricity, natural gas, and alternative fuels; reduced demand for gasoline and diesel fuels.
ORHD-07	Zero Emission Airport Shuttle Buses (NOx, ROG, PM2.5)	Implementation of technologies to accelerate the penetration of zero and near-zero emission airport shuttles, including the use of alternative fuels.	Potential increased demand for electricity, natural gas, and alternative fuels; reduced demand for gasoline and diesel fuels.
ORHD-08	Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission heavy duty vehicle engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential increased demand for electricity, natural gas, and alternative fuels; reduced demand for gasoline and diesel fuels.
ORHD-09	Further Development of Cleaner Technology: On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential increased demand for electricity, natural gas, and alternative fuels; reduced demand for gasoline and diesel fuels.
ORFIS-01	More Stringent National Locomotive Standards (NOx, ROG)	Use of Tier 5control equipment such as SCRs, alternative fuels, DPM filters and electric batteries.	Potential increased demand for electricity, natural gas, and alternative fuels; reduced demand for gasoline and diesel fuels.
ORFIS-03	Incentivize Low Emission Efficient Ship Visits (NOx)	Incentives for the use of control equipment such as SCRs.	Potential increase in electricity demand.
ORFIS-04	At-Berth Regulation Amendments (NOx, ROG)	Further reduce emissions from ships at berth and advance the use of zero and near-zero emission technologies.	Potential increase in electricity demand.
ORFIS-05	Further Development of Cleaner Technology: Off-Road Federal and International Sources (NOx, ROG)	Measure to accelerate deployment of cleaner marine, rail and aircraft off-road technology by increasing incentive program.	Potential increased demand for electricity, natural gas, and alternative fuels; reduced demand for gasoline and diesel fuels.
OFFS-01	Zero-Emission Off-Road Forklift Regulation Phase 1 (NOx, ROG)	Measure to accelerate the penetration of zero emission technologies to be used in off road forklifts.	Potential increased demand for electricity, natural gas, and alternative fuels; reduced demand for gasoline and diesel fuels.

TABLE 4.2-1 (concluded)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	ENERGY IMPACTS
OFFS-04	Zero-Emission Airport Ground Support Equipment (NOx, ROG, PM2.5)	Measure to accelerate the penetration of zero emission technologies to be used in airport ground support equipment.	Potential increased demand for electricity, natural gas, and alternative fuels; reduced demand for gasoline and diesel fuels.
OFFS-05	Small Off-Road Engines (NOx, ROG)	Measure to accelerate the penetration of zero emission technologies to be used in small off-road engines.	Potential increased demand for electricity, natural gas, and alternative fuels; reduced demand for gasoline and diesel fuels.
OFFS-06	Transport Refrigeration Units Used For Cold Storage (NOx, PM, GHG)	Measure to accelerate penetration of zero emission technologies in cold store refrigeration unites.	Potential increased demand for electricity and reduced demand for gasoline and diesel fuels.
OFFS-08	Further Deployment of Cleaner Technologies: Off-Road Equipment (NOx, ROG, PM2.5)	Measure to accelerate the implementation of zero emission technologies in off-road equipment.	Potential increased demand for electricity, natural gas, and alternative fuels.

4.2.3 SIGNIFICANCE CRITERIA

The NOP/IS concluded that the 2016 AQMP would not conflict with adopted energy conservation plans or standards, would comply with existing energy standards, and would not use non-renewable resources in a wasteful or inefficient manner. However, implementation of the 2016 AQMP would cause significant adverse energy impacts if any of the following conditions occur:

- The project results in substantial depletion of existing energy resource supplies.
- An increase in demand for utilities impacts the current capacities of the electric and natural gas utilities.

4.2.4 IMPACT ANALYSIS

Project-specific energy impacts associated with the projected increased demand for electricity, natural gas, and alternative fuels have been evaluated in this section.

4.2.4.1 Electricity

Potential electricity impacts relative to the energy baseline are discussed below. The potential increase in electricity demand due to the implementation of the 2016 AQMP is partially associated with the potential installation of add-on air pollution control equipment. A number of control measures could result in the installation of air pollution control equipment on existing sources including: CMB-05, BCM-01, BCM-05, BCM-06, BCM-07, BCM-10, TXM-01, TXM-02, TXM-04, TXM-05, TXM-06, TXM-07, TXM-08, and TXM-09. Add-on air pollution control equipment can reduce air emissions in a number of different ways (e.g., by using filters to remove particulates, or by installing units that produce a chemical reaction to remove a pollutant), but they generally require electricity to operate. The use of add-on air pollution control equipment and associate chemicals (e.g., wet scrubbers, low NOx burners, and catalysts) could result in an increase in electricity demand. For example, a wet gas electrostatic precipitator (ESP) and wet gas scrubber (WGS) were installed on the Fluid Catalytic Cracking Unit (FCCU) at the ConocoPhillips Los Angeles Refinery. The estimated electricity required to operate the ESP and WGS was about 715 kilowatts (kW) (SCAQMD, 2007). FCCUs are large emission sources and the electricity need to operate the ESP and WGS at the ConocoPhillips Refinery would be representative of air pollution control equipment for large sources. The electricity use to operate air pollution control equipment at smaller sources would generally be less.

There is the potential increase in electricity demand and use associated with the electrification of stationary sources, including: CMB-01, CMB-02, FLX-02, and BCM-09.

In December 2015, the SCAQMD certified a Final Program Environmental Assessment (December 2015 Final PEA) for Proposed Amendments to Regulation XX - RECLAIM (SCAQMD, 2015) which evaluated the potential increase in electricity demand associated with the implementation of additional emission reductions under RECLAIM. CMB-05 would seek further NOx reductions under the RECLAIM program which may cause related energy impacts. Table 4.2-1 summarizes the estimated number of NOx emission control devices that were estimated in the December 2015 Final PEA prepared for NOx RECLAIM per sector and per equipment/source category. Similarly, control measure CMB-05 may encourage the installation of different types of control devices including SCR, SNCRs, a proprietary Low Temperature Oxidation technology (LoTOx^{TM}) with or without a WGS, and catalyst impregnated filters with a Dry Gas Scrubber (UltraCat DGS). In total, the December 2015 Final PEA for NOx RECLAIM estimated that the following new NOx air pollution control equipment could be installed: up to 117 SCRs, eight LoTOx^{TM} with WGSs, one LoTOx^{TM} without WGS, and three UltraCat DGSs. Control measure CMB-05 would be expected to result in similar, but fewer impacts, because CMB-05 would require the approximately five tons per day of NOx emission reduction by 2031, while the analysis in the December 2015 Final PEA was based on achieving 14 tons per day of NOx reductions by 2022).

TABLE 4.2-2

Estimated Number of NOx Control Devices Per Sector and Equipment/Source Category

Sector	Equipment/Source Category	Number of Affected Facilities	Estimated Number of Control Devices
Refinery	Fluid Catalytic Cracking Units (FCCUs)	5	2 SCRs 2 LoTOxTM with WGSs 1 LoTOxTM without WGS
Refinery	Refinery Process Heaters and Boilers	8	74 SCRs
Refinery	Refinery Gas Turbines	5	7 SCRs
Refinery	Sulfur Recovery Unit / Tail Gas Units (SRU/TGUs)	5	5 LoTOxTM with WGSs 1 SCR
Refinery	Petroleum Coke Calciner	1	1 LoTOxTM with WGS or 1 UltraCat with DGS
Non-Refinery	Container Glass Melting Furnaces	1	2 SCRs or 1 UltraCat with DGS
Non-Refinery	Sodium Silicate Furnaces	1	1 SCR or 1 UltraCat with DGS
Non-Refinery	Metal Heat Treating Furnaces	1	1 SCR
Non-Refinery	Internal Combustion Engines (Non-Refinery/Non-Power Plant)	3	16 SCRs
Non-Refinery	Turbines (Non-Refinery/Non-Power Plant)	7	13 SCRs and 1 SCR replacement
TOTAL:			**114 to 117 SCRs** **7 to 8 LoTOxTM with WGSs** **1 LoTOxTM without WGS** **0 to 3 UltraCat**

SCAQMD, 2015

If add-on air pollution control devices are installed and operating, adverse energy impacts (e.g., increased demand in energy) may occur during operation due to the need for electricity to operate the air pollution control devices. Tables 4.2-3 and 4.2-4 summarize the estimated impacts on operational electricity use based on the analysis contained the December 2015 Final PEA for NOx RECLAIM on a per facility and per sector basis, respectively.

TABLE 4.2-3

Potential Operational Energy Use Per Refinery Facility

Refinery ID	**Affected Equipment/ Source Category and Potential NOx Control Equipment**	**Potential Increased Electricity Demand** (kWh/day)	**Potential Increased Instantaneous Electricity Demand** (MW)
1	SRU/TGU: 1 LoTOx™ with WGS Gas Turbine: 1 SCR Boilers/Heaters: 5 SCRs	41,307	1.72
2	Coke Calciner: 1 LoTOx™ with WGS or 1 Ultracat DGS	17,711	0.74
3	Boilers/Heaters: 2 SCRs	1,628	0.07
4	FCCU: 1 LoTOx™ with WGS Gas Turbine: 1 SCR Boilers/Heaters: 2 SCRs	25,162	1.05
5	FCCU: 1 SCR SRU/TGU: 2 LoTOx™ with WGSs SRU/TGU: 1 SCR Gas Turbine: 3 SCRs Boilers/Heaters: 4 SCRs	24,733	1.03
6	FCCU: 1 SCR SRU/TGU: 1 LoTOx™ with WGSs Gas Turbine: 1 SCR Boilers/Heaters: 5 SCRs	21,878	0.91
7	FCCU: 1 LoTOx™ without WGS Gas Turbine: 1 SCR Boilers/Heaters: 3 SCRs	8,168	0.34
8	SRU/TGU: 1 LoTOx™ with WGS Boilers/Heaters: 3 SCRs	14,307	0.60
9	FCCU: 1 LoTOx™ with WGS Boilers/Heaters: 2 SCRs	20,445	0.85
TOTAL		**168,170**	**7.01**

SCAQMD, 2015

TABLE 4.2-4

Potential Operational Energy Use Per Non-Refinery Facility

Non-Refinery ID	Affected Equipment/ Source Category and Potential NOx Control Equipment	Potential Increased Electricity Demand (kWh/day)	Potential Increased Instantaneous Electricity Demand (MW)
1	ICEs: 5 SCRs Gas Turbines: 3 SCRs	14,368	0.60
2	ICEs: 6 SCRs Gas Turbines: 4 SCRs	3,088	0.13
3	ICEs: 5 SCRs	462	0.02
4	Gas Turbines: 1 SCR	608	0.03
5	Gas Turbines: 2 SCRs	1,217	0.05
6	Gas Turbines: 1 SCR	608	0.03
7	Gas Turbines: 2 SCRs	9,370	0.39
8	Glass Melting Furnace: 2 SCRs	2,916	0.12
9	Sodium Silicate Furnace: 1 Tri-Mer	1,248	0.05
10	Metal Heat Treating Furnace: 1 SCR	11,458	0.48
11	Gas Turbines: 1 SCR (replacement of existing)	0	0
TOTAL		45,344	1.89

SCAQMD, 2015

Based on Tables 4.2-3 and 4.2-4, the analysis in the December 2015 Final PEA concluded that the total increase in electricity demand at the affected NOx RECLAIM facilities was 213,514 kwh/day or 8.9 MW. Thus, CMB-05 would likely encourage the installation of similar additional air pollution control equipment with similar electrical requirements, but on a smaller scale since the projected NOx emission reductions and corresponding increase in electricity demand under CMB-05 are expected to be much less for five tons per day of NOx emission reduction than the electricity demand estimated for 14 tons per day of NOx emission reductions as analyzed in the December 2015 Final PEA.

The actual potential increase in the amount of electricity use due to the implementation of the 2016 AQMP is unclear at this time because specific information regarding the number and size of the air pollution control devices that may be installed are currently unknown. Additionally, alternative processing equipment is expected to be the primary method of control for some of the control measures. For example, the primary method for reducing VOC emissions from coatings and solvents (FLX-02) is expected to be achieved without installing any air pollution control equipment but instead by manufacturers reformulating coatings and solvents and developing more efficient application techniques, which would likely be energy neutral.

Mobile source control measures in the 2016 AQMP are expected to increase the electricity demand in the Basin. A number of control measures would result in increased electricity demand due to the electrification of mobile sources, including: MOB-01, MOB-02, MOB-03, MOB-04, MOB-05, MOB-07, MOB-09, MOB-10, MOB-13, EGM-01, ORLD-01,ORLD-03, ORHD-02, OFHD-04, ORHD-05, ORHD-06, ORHD-07, ORHD-08, ORHD-09, ORFIS-01, ORFIS-03, ORFIS-04, ORFIS-05, OFFS-01, OFFS-04, OFFS-05, OFFS-06, and OFFS-08. Electrification is expected to shift some of the fuel sources for cars, trucks, off-road vehicles and marine vessels from gasoline and diesel fuels to electricity as well as create an additional electrical load demand due to CNG refueling.

Between March 2011 and July 2015, more than 146,000 electric vehicles were sold in California, with about 2,248 public electric charging stations operating throughout California (CEC, 2016i). Assuming about 0.01 gigawatts per hour (GWh), the total electricity used by vehicles in California was about 1,460 GWh. The CEC projects that there will be 1.5 million electric vehicles in use by 2025, in support of the Executive Order by Governor Brown which encourages zero-emission vehicles by 2025. The 2016 AQMP, as well as CARB's SIP Strategy, are expected to encourage the use of additional electric vehicles.

The estimated baseline electricity use in Los Angeles, Orange, Riverside, and San Bernardino counties was about 120,960 GWh in 2014 (CEC, 2016h, see Table 3.3-1). Therefore, electricity needed to charge vehicles currently represents a relatively small portion of the overall electricity used (about 1 percent) in the four counties. The CEC estimates an increase in electricity demand of about 1 to 1.3 percent per year through 2026 (CEC, 2016k). Assuming that growth rate, the total projected electricity use would be an approximately 135,475 to 140,000 GWh by 2024 and an approximately 141,532 to 147,692 GWh by 2031.

The potential increase in electricity demand can be estimated for Control Measures MOB-05, ORLD-03, ORHD-04, and ORHD-09 from the projected increase in the number of zero and near-zero emission vehicles that will be introduced into the market (Table 4.2-5).

MOB-09, ORHD-08, ORHD-06, and ORHD-09 could result in the construction of electric or magnetic power built into roadway infrastructures to boost the pulling capacity or range of the heavy-duty vehicles. The electric or magnetic power for specially equipped heavy-duty trucks would require additional electricity. The Draft EIR/EIS prepared for the Interstate 710 (I-710) Corridor Project included an alternative which included the installation of an electric roadway infrastructure. The Draft EIR/EIS concluded that this alternative would increase electricity demand between 157 and 183 GWh per year (Caltrans, 2012). Caltrans is currently in the process of revising the Draft EIR/EIS for the I-710 Corridor and the corresponding alternatives analysis which is expected to be available for review and comment in Spring 2017. Thus, the electrical use estimates for these control measures are preliminary.

In addition to the I-710 Corridor Project, another potential location for electric roadway infrastructure is being considered for the State Route 60 (SR-60) Freeway. To estimate the potential electrical demand for an electric roadway infrastructure along the SR-60 Freeway, the electrical demand per mile would likely be equivalent or similar to the electricity demand estimates for the I-710 Corridor Project, except for a distance that is twice as long. Therefore, the estimated electricity demand for retrofitting the SR-60 Freeway with an electric roadway infrastructure would be between 320 and 380 GWh. No other projects have been proposed that would include the use of an electric roadway infrastructure elsewhere in the Basin. Therefore, the estimated peak electricity demand associated with the possible installation of roadway electric power on both the I-710 and SR-60 is 563 GWh (see Table 4.2-4).

Control measure ORFIS-04 would reduce emissions from ships at berth if more ships use cold ironing, which is the process of providing shoreside power electrical power to a ship at berth while its main and auxiliary engines are turned off. Electricity can be provided to ships shoreside via electrical cables. Shoreside power can be locally generated at the port using clean technologies such as fuel cells, gas turbines, microturbines, and combined cycle units or obtained from the electrical grid. Shoreside power can be locally generated. Due to technical and operational reasons, cold ironing may not be a viable option for all types of ships.

TABLE 4.2-5
Electricity Impacts for Los Angeles, Orange, Riverside, and San Bernardino Counties (GW-h)

CONTROL MEASURE	2014	2023[a]	2031
Electricity Supply/Capacity	120,960	131,846	141,523
MOB-05, MOB-14, ONLD-01, and ORLD-03 – Penetration of Partial-Zero and Zero Emission Vehicles (357,000 vehicles by 2023, 714,000 by 2031)[b]	--	1,530	3,059
ORHD-04 – Advanced Clean Transit (11,000 buses)[c]	--	183	183
ORHD-03, ~~ORHD-04,~~ ORHD-05, ORHD-06, ORHD-08 – Partial-zero and zero emissions Light, Medium and Heavy-Duty Trucks (115,000 by 2023 and 245,000 by 2031)[c]	--	1,909	4,067
OFFS-01, OFFS-04, OFFS-06 – TRUs, Forklifts and Ground Support Equipment (50,000 by 2023 and 100,000 by 2031)[d]	--	85	170
OFFS-05 – Lawn Equipment (2 million by 2023 and 4 million by 2031)[e]	--	3,200	6,400
OFFS-02, OFFS-08 – Larger Off-road Diesel/Gasoline Equipment (30,000 by 2023 and 60,000 by 2031)[c]	--	498	996
OFFS-03, OFF-08 – Construction and Industrial Equipment (20,000 by 2023 and 40,000 by 2031)[c]	--	332	664
Electric Roadway Infrastructure of the I-710 and 60 Freeways (MOB-09, ORHD-06, ORHD-08, and ORHD-09)[f]	--	563	563
ORFIS-04 – At-Berth Regulation Amendments[g]	--	1,927	1,927
Total Electrical Use for Mobile Source Measures	**--**	**10,227**	**18,029**
Percent of Capacity	--	7.8%	12.7%

(a) Projections based on CEC, 2016h, assuming an average increase in electricity use of 1% per year.
(b) Based on 12,600 miles/year and 0.34 kWh/mile.
(c) Based on 16,600 miles/year and one kWh/mile.
(d) Based on 5,000 miles/year and 0.34 kWh/mile
(e) Based on 200 days/year of operation at 1 kWh per hour
(f) Based on Caltrans, 2012.
(g) Based on Port of Los Angeles, 2014. Assumes 220 MW is operating 24 hours per day for 365 days per year.

To handle the potential increase in electricity demand which is projected to quadruple by 2030 at the Port of Long Beach (Port of Long Beach, 2015), the Port of Long Beach has implemented their Energy Island Initiative, which is a comprehensive strategy for transitioning the Port of Long Beach to renewable power sources and self-generation systems. One goal of this initiative is for the Port of Long Beach to operate independently from the electricity grid in times of emergency or other needs.

An EIR was prepared for the Middle Harbor development in the Port of Long Beach and the analysis estimated that the electricity consumption would be about 986 megawatt-hours (0.2 MW, assuming 365 days of operation for 24 hours per day) if the Middle Harbor container terminal operations used cold ironing and if electrical connections were made to buildings and other wharf structures (e.g., lighting). While the projected increased demand in electricity was considered extensive, the quantity was determined to not be substantial relative to the existing and projected regional electricity supply (Port of Long Beach, 2009).

Similarly, the Port of Los Angeles has prepared their Energy Management Action Plan which outlines actions that the Port of Los Angeles needs to take to meet future increases in electricity demands which are projected to double or potentially triple over the next decade due to anticipated increases in throughput and expanded use of alternative maritime power (AMP), electric equipment (including electric cargo handling equipment), and terminal automation. The Port of Los Angeles estimated the annual average hourly demand for electricity was 27 MW per hour (peak of 55 MWh) in 2012. With the combined increased use of AMP and the automation of container terminals, peak electricity demands are expected to increase from 55 MW to a range of 96 MW to 161 MW at the container terminals (Port of Los Angeles, 2014). For purposes of the analysis herein, the electricity demand at both ports in response to implementation of control measure ORFIS-04 is expected to double from about 110 MW to 220 MW (assuming that the ports are operating 24 hours per day and 365 days per year).

Renewable energy will be relied upon to supply the projected increases in electricity demand due to general population growth, both inside and outside of California. Increases in electricity demand are projected to occur with or without implementing the 2016 AQMP. The 2012 AQMP Final Program EIR evaluated the projected increases in electricity demand from AQMP control measures proposed at that time and the analysis noted that there were a number of power plant projects planned in southern California to meet future electricity needs. In fact, from year 2012 through 2014, in southern California alone, new power plants representing over 2,900 MW of electricity generation have become operational, power plants representing 785 MW are currently under construction[1], and a number are in the planning stages (CEC, 2016m). Relative to the existing electricity use and the projected future peak electricity demand, implementation of all the control measures is expected to result in an overall increase of 7.86 percent of the existing electricity use by 2024 and 12.7 percent of the existing electricity use by 2031 (see Table 4.2-4). While these projected increases are expected to be within the electric generating capacity of the region, an increase in electricity of one percent or greater is considered to exceed the SCAQMD's energy significance threshold. Further, there could be electrical requirements for other control measures for which the electrical demand cannot be estimated at this time. Thus, the energy impacts resulting from potential increases in electricity demand as part of implementing the 2016 AQMP are expected to be significant.

The energy impacts for electricity demand, as presented above for control measures where sufficient data exist are expected to be conservative. The peak daily demands for increased electricity associated with further electrification of mobile sources and the energy impacts could be minimized by charging electric vehicles or other equipment at night when the electricity demand is low. Further, the analysis assumes that all sources affected by a control measure with the

[1] Neither facility is located within the boundaries of the Basin.

potential to increase the demand for electricity and would use electricity rather than substituting other types of energy. In addition, any increase in electricity demand would likely result in a concurrent reduction in demand for other types of fuels, particularly petroleum-based fuels. The 2016 AQMP is not expected to result in the use of large amounts of fuel or energy resources or result in the use of fuel or energy resources in a wasteful manner. However, the 2016 AQMP includes incentives to shift from using diesel and gasoline fuels and instead shift to increasing the electrification of stationary and mobile sources. Depending on the location and the amount of energy needed, the electricity portions of existing energy conservation plans that have been adopted by facilities such as the ports may need to be updated. Therefore, the proposed project may conflict with existing adopted energy conservation plans. Because the 2016 AQMP could result in a substantial increase in electricity demand at a level greater than one percent of the existing electricity use in the Basin, the projected increases to electricity demand are potentially significant.

It should be noted that the 2016 AQMP would also have some beneficial impacts on energy use. For example, implementation of the 2016 AQMP is expected to cause a shift away from petroleum-based fuels towards the incentivized use of electric vehicles (including trucks) and other equipment. The types of vehicles and equipment that may be used to meet some of the goals of these incentives is currently unknown but could include partial-zero emissions vehicles (such as hybrids) and zero emission vehicles which include electric vehicles and hydrogen fuel cell vehicles. The electrical grid and hydrogen supply supporting these electric vehicles would need to generate 50 percent of renewable energy by 2030, as required by the Clean Energy and Pollution Reduction Act of 2015. A large portion of the fuels for combustion engine vehicles would also need to be sourced from renewable feedstock.

Implementation of the 2016 AQMP is expected to shift from the use of gasoline and diesel fuels to battery-electric, hydrogen, and natural gas instead. It would also promote the increased demand and supply of low-emission diesel fuels. However, the 2016 AQMP is not expected to result in an increase in the number of vehicles.

According to Appendix F of the CEQA Guidelines, Energy Conservation, the wise and efficient use of energy includes: 1) decreasing the overall per capita energy consumption; 2) decreasing the reliance on fossil fuel such as coal, natural gas, and oil; and, 3) increasing the reliance on renewable energy sources. Implementation of the 2016 AQMP would increase the amount of renewable energy supplies because the increased use of partial zero and zero emission vehicles would be powered more by electricity and biodiesel fuel instead of by petroleum-based fuels such as gasoline and diesel. Thus, the 2016 AQMP would support the efficient use of energy by decreasing the use of fossil fuels and increasing the reliance on renewable energy sources, which in turn will provide a beneficial long-term operational impact on energy conservation. Further, the 2016 AQMP includes a strategy that promotes energy conservation (FLX-01) without identifying specific targets so these benefits have not been quantified in this analysis. Nonetheless, the 2016 AQMP impacts on electricity resources are potentially significant.

4.2.4.2 Natural Gas

Control measures in the 2016 AQMP may result in an increased demand for natural gas associated with stationary sources due to the need for additional emission controls, including CMB-05, BCM-01, BCM-05, BCM-06, BCM-07, BCM-10, TXM-01, TXM-02, TXM-04, TXM-05, TXM-06, TXM-07, TXM-08, and TXM-09. Other mobile source control measures could encourage the use of natural gas as a fuel to offset the use of petroleum fuels including MOB-01, MOB-02, MOB-03, MOB-04, MOB-05, MOB-07, MOB-09, MOB-10, MOB-13, EGM-01,ORLD-01, ORLD-03, ORHD-02, ORHD-04, ORHD-05, ORHD-06, ORHD-07, ORHD-08, ORHD-09, ORFIS-01, ORFIS-02, ORFIS-03, ORFIS-05, OFFS-01, OFFS-04, OFFS-05, and OFFS-08. In addition, the projected increased demand for electricity will also require additional natural gas since most of the power plants in California generate electricity from equipment that uses natural gas.

The total natural gas (utility) consumption in California in 2014 was approximately 6,175 million standard cubic feet (mmscf) per day in 2014 and 4,192 million therms within the Basin. The residential, commercial, industrial, and electrical generation sectors account for approximately 20, 8, 15, and 40 percent, respectively, of the total statewide natural gas consumption by utilities. As shown in Table 4.2-6, the demand for natural gas in California is expected to decrease in many sectors, as the use of renewable fuels increases.

TABLE 4.2-6
Actual (2011) and Modeled Natural Gas Demand in California (mmscf/day)

Reference Case	Million cubic feet per day				
	2011	2015	2020	2025	% Change 2011-2025
Residential	1,352	1,297	1,312	1,333	-1%
Commercial	554	544	574	593	7%
Industrial	1,486	1,478	1,437	1,398	-6%
Transportation	42	40	40	42	0%
Power Generation	2,180	2,670	2,204	2,157	-1%
EOR/Cogen	124	123	117	115	-7%
TOTAL	5,738	6,152	5,684	5,639	-2%
Low Demand/High Price Case					
Residential	1,352	1,273	1,311	1,346	0%
Commercial	554	530	556	582	5%
Industrial	1,486	1,382	1,363	1,340	-11%
Transportation	42	38	37	39	-8%
Power Generation	2,180	2,446	1,825	1,616	-35%
EOR/Cogen	124	116	111	107	-15%
TOTAL	5,738	5,786	5,203	5,030	-14%
High Demand/Low Price Case					
Residential	1,352	1,297	1,312	1,328	-2%
Commercial	554	549	579	593	7%
Industrial	1,486	1,491	1,447	1,408	-5%
Transportation	42	40	42	45	6%
Power Generation	2,180	3,026	1,895	2,864	31%
EOR/Cogen	124	157	158	166	34%
TOTAL	5,738	6,561	6,433	6,404	12%

Source: CEC, 2013

The natural gas demand by sector is shown in Table 4.2-6 and the entries for 2011 represent actual natural gas data while the fields for subsequent years contain natural projections. In all cases, demand for the residential sector remains relatively the same due to energy efficiency measures that are currently in effect and are expected to continue to reduce the natural gas demand per capita . For all cases, the demand for natural gas in the power generation sector shows an increase in 2015 followed by a decrease in demand in subsequent years. It is important to note that the demand for power generation from natural gas fired units was low in 2011 due to high precipitation levels occurring that year which caused greater supplies in electricity that was generated by hydroelectric power. The California's Renewables Portfolio Standard mandate which requires 33 percent of renewables by 2020 is driving an increase of generating electricity with renewable energy which otherwise would have been met by natural-gas fired generating units. However, because of the intermittent nature of renewable generation, natural gas-fired units may continue to be needed to provide coverage during short-term mismatches between supply and demand. Going forward, it is important that the natural gas system continues to have flexibility to be able to accommodate any short-term ramping up and down of natural gas units that will be required to integrate renewables. Thus, an increase in natural gas is still expected under certain scenarios (CEC, 2013).

The natural gas vehicle market is expected to continue to grow due to government (federal, state, and local) incentives and regulations related to the purchase and operation of alternative fuel vehicles, growing numbers of natural gas engines and vehicles, and the increasing cost differential between petroleum-based fuels (gasoline and diesel) and natural gas. At the end of 2013, there were 289 compressed natural gas fueling stations delivering 11.4 billion cubic feet of natural gas during that year. The natural gas vehicle market is expected to grow substantially from 11.4 billion cubic feet in 2013 to 23.3 billion cubic feet in 2035, a growth rate of just over 3.3 percent per year (CGR, 2014). The increase in natural gas as a transportation fuel would cause a decrease in the use of petroleum-based fuels.

Some of the control measures in the 2016 AQMP may cause an increase in the use of natural gas in medium- and heavy-duty on-road vehicles. The expanded use of alternative fuels in medium- and heavy-duty trucks using more efficient, advanced natural gas engine technologies would be expected to reduce diesel fuel use. Natural gas medium- and heavy-duty vehicles are considered to be an attractive environmental option to diesel-fueled vehicles because the natural gas vehicles emit fewer criteria pollutants and toxic components. However, hybrid vehicles and zero emission electric vehicles are further along in the development phase and expected to be the preferred over vehicles powered by natural gas.

For stationary sources, since natural gas is already BACT, new equipment is currently required to use natural gas. Under the 2016 AQMP control measures, a slight increase in natural gas demand is expected from the use of add-on air pollution control equipment associated with achieving NOx, VOC and PM emission reductions. The amount of natural gas needed to operate add-on air pollution control devices is unknown because the number of equipment required and the equipment sizes are not known. Equipment replacements or retrofits are expected to occur for implementation of some of the control measures, resulting in energy efficiency as newer and retrofitted equipment (e.g., low NOx burners) are generally more energy efficient.

Approximately 40 percent of the natural gas consumed in California is used at power plants to generate electricity. Southern California Edison projects that additional electricity generating capacity will be needed in order to accommodate future increases in population due to growth. The increased electricity demand expected in the Basin would be met by natural gas-fueled power plants resulting in an estimated increased demand for natural gas by about 2,864 mmscf by 2025 (Table 4.2-6).

As shown in Table 4.2-6, natural gas use in the residential sector is expected to remain relatively the same, as energy efficiency measures are expected to continue to stabilize or reduce demand in this sector. Further, an overall decline in the demand for natural gas in the power generation sector in California is expected to occur over the next decade as more renewable generation and efficiency measures will reduce the need for natural gas-fired electricity generation. By 2020, 33 percent of electricity generation will be met with renewable sources, which will result in less natural gas needed to meet the energy demands.

Natural gas supplies are abundant as a result of technological innovations. For example, some natural gas bearing formations such as shale reservoirs, previously inaccessible, are now producing in 31 states (including California) and causing a dramatic increase in North American natural gas availability. The natural gas outlook in 2007 predicted that 700 trillion cubic feet of natural gas would be economically recoverable, but that outlook has now increased to nearly 1,400 trillion cubic feet of natural gas, a 100 percent increase (CEC, 2013).

4.2.4.3 Petroleum Fuels

Implementation of the 2016 AQMP is expected to decrease the future demand for petroleum fuels (e.g., diesel, distillate, residual oil, and gasoline) due to mobile source control measures combined with improved engine efficiencies due to retrofits of new engines. Control measures that are expected to result in a decreased demand for petroleum fuels include control measures that would result in the installation of new, more fuel efficient engines in mobile sources, the use of alternative fuels, and, the increased electrification of mobile sources.

Control Measures MOB-05, ORLD-03, ORHD-04, and ORHD-09 are expected to encourage the introduction of 500,000 to 600,000 partial-zero and zero-emission vehicles, 11,000 buses, and 100,000 to 150,000 trucks (see Table 4.2-4). A number of other control measures that are expected to result in a decrease of petroleum fuel use include MOB-01, MOB-02, MOB-03, MOB-04, MOB-07, MOB-09, MOB-10, MOB-13, MOB-14, EGM-01,ORLD-01, ORHD-02, ORHD-05, ORHD-06, ORHD-07, ORHD-08, ORFIS-01, ORFIS-02, ORFIS-03, ORFIS-05, OFFS-01, OFFS-04, OFFS-05, and OFFS-08. However, actual reductions in petroleum fuel use from these control measures, however, is not known at this time.

Table 4.2-7 shows that petroleum fuel use is projected to be 6.8 to 7.2 billion gallons in 2040which reflects a 22.5 to 27.4 percent net reduction in southern California from the 9.3 billion gallons consumed in 2012.

TABLE 4.2-7

Southern California Estimated Transportation Fuel Consumption

	Fuel Consumed		Percentage under Existing Use
	Billion Gallons per year	Thousand Gallons per Day	
2012	9.3	25,570	--
2040	7.2	19,805	-22.5
2040 (with RTP/SCS)	6.8	18,560	-27.4

Source: SCAG, 2016.

Construction activities that may be necessary in order to implement control measures in the 2016 AQMP would increase the use of gasoline and diesel. Construction activities may be necessary for a variety of control measures in order to develop and build a transportation infrastructure, install air pollution control equipment, and further develop and build an electricity infrastructure to support the electrification of sources. The amount of petroleum fuels needed for construction would depend on the extent of the specific construction activities employed. For example, larger construction projects typically use the most fuels and are likely to require project specific CEQA review to evaluate the specific energy needs.

There are currently adequate fuel supplies in California. For example, in fiscal year 2014, 14,573,637,973 gallons of gasoline and 2,741,781,694 gallons of diesel fuel were sold in California (CSBE, 2014). Construction activities are temporary and all construction equipment will cease once construction activities are finished. As the use of petroleum fuels by other mobile sources decreases, there is likely to be an excess supply of gasoline and diesel. Because implementation of the 2016 AQMP is expected to result in an overall reduction in the use of petroleum fuels (see Table 4.2-6), any increases in fuel use for construction purposes would be not be expected to be greater than the overall reduction in the use of petroleum fuels. Therefore, no significant adverse impacts on petroleum fuels are expected due to implementation of the 2016 AQMP.

Emissions from mobile sources are the largest contributors of emissions in the Basin. Overall, implementation of the 2016 AQMP is expected to result in a large emissions reduction from mobile sources which can be partly attributable to a reduction in the use of petroleum-based fuels due to requirements that would result in higher energy efficiencies or that would be displaced by less polluting alternative fuels. The largest reductions in the use of petroleum-based fuels are expected from the on-road mobile source sector switching to electricity or alternative fuels (see Table 4.2-6).

4.2.4.4 Alternative Fuels

4.2.4.4.1 Biodiesel

Biodiesel has similar fuel properties as petroleum-based diesel fuel which makes it an easy substitute for use in diesel engines. The advantages of combusting biodiesel in lieu of petroleum-based diesel include decreased emissions of net carbon dioxide (GHG), hydrocarbon, carbon monoxide, and particulate matter.. However, biodiesel also has disadvantages which include poorer cold flow characteristics, lower heating values, and higher NOx emissions than petroleum-based diesel. In light of recent policies that provide incentives or require the use alternative fuels, such as the federal Renewable Fuel Standard and the California Low Carbon Fuel Standard, there has been more interest in the production of biodiesel. Biodiesel use has been gradually increasing over the past few years in California, but there is a potential constraint in securing enough low-carbon intensity feedstock to produce biodiesel and renewable diesel. The bulk of renewable diesel available on the market today is produced in Singapore and shipped to California (CEC, 2013). As such, biodiesel use in California is estimated to have been nearly 136 million gallons in 2013. There are 18 biodiesel fueling stations in southern California.

To the extent that partial-zero and zero emission technologies such as electrification are implemented as a result of implementing 2016 AQMP control measures, the demand for biodiesel would be expected to decline similar to the projected declines in demand for petroleum-based diesel fuel.

4.2.4.4.2 Ethanol and E85

There are a number of 2016 AQMP control measures that identify alternative fuels as a potential compliance option. Since many of the control measures ultimately call for low or zero emitting equipment, it is unclear whether ethanol or ethanol blends would be used as a compliance option Nonetheless, this analysis conservatively assumes that there would be an increased demand for ethanol and ethanol blends such as E85 as combustion fuels. Currently, most of the ethanol used in California is imported from corn-based ethanol plants in the Midwest and is transported into California via rail. In addition, three facilities produce ethanol in California at an estimated 220 million gallons per year (CEC, 2013). Because the 2016 AQMP seeks to convert emission sources to alternatives which are zero emissions, such as electricity, it is likely that there is sufficient ethanol production capacity to meet any increased demands that may result from implementing the control measures in the 2016 AQMP.

4.2.4.4.3 Hydrogen

There is a growing interest and financial support for the use of hydrogen-powered fuel cells to power cars, trucks, homes, and businesses. Hydrogen vehicles in California consist of demonstration fuel cell passenger cars, internal combustion engine passenger cars, fuel cell buses, and hybrid fuel cell buses. The California Fuel Cell Partnership, a public-private partnership between interested industry and state and local government agencies, has been leading the coordination of fuel cell vehicle demonstrations in California. As of June 2016, 20 hydrogen fueling stations are located in the southern California region plus an additional 18 stations are expected to be opened by the end of 2016, although station development has progressed at a slower pace than projected in 2015 (CARB, 2016b).

Hydrogen fuel cells are proven technology, but more work is needed to make them cost-effective for use in cars, trucks, homes, or businesses. There are currently 331 hydrogen fuel cell electric vehicles registered in California. Hydrogen fuel cell electric vehicles create electricity to power cars with minimal pollution. California has been developing the infrastructure of a hydrogen highway to assure that hydrogen fueling stations are in place to meet the demands of fuel cell and other hydrogen vehicle technologies. CARB is focusing on putting additional emphasis on creating clusters of hydrogen fueling stations in key urban areas such as Los Angeles and Orange counties, Sacramento, and the San Francisco Bay area (CARB, 2016b).

CARB has projected that California's on-road hydrogen fuel cell vehicles will grow to about 13,500 vehicles in 2019 and 43,600 vehicles in 2022. Auto manufacturers continue to develop and bring to market their fuel cell electric vehicles. For example, in October 2015, Toyota launched the retail sale and lease of its Mirai sedan. Also in March 2016, Honda began sales of its new Clarity Fuel Cell sedan in Japan with an expected launch scheduled in the United States for the end of 2016. In May 2016, the Capitol Hyundai dealership in San Jose became the first Hyundai dealer in northern California to deliver a hydrogen fuel cell vehicle to a customer. Mercedes Benz is planning on releasing its hydrogen fuel cell SUV in 2017. Lexus, General Motors, and Audi have also debuted hydrogen fuel cell vehicle concept models (CARB, 2016b).

One of the goals of the 2016 AQMP is to shift from conventional petroleum-based fuels to less polluting alternative transportation fuels, including hydrogen. Although the 2016 AQMP does not mandate hydrogen fuel use by fleet operators, it does need further technology demonstration and deployment. In addition, at the current pace of developing hydrogen fueling stations, forecasts predict that there will not be a sufficient amount of hydrogen fueling capacity by 2020, unless additional funding sources are located. The development of hybrid and electric vehicles and deployment into the market are much further along in the development process than hydrogen fuel cell vehicles.

4.2.4.4.4 Propane (LPG)

There are a number of 2016 AQMP control measures that identify alternative fuels as a potential compliance option. Since many of the control measures ultimately call for low or zero emitting equipment, propane or liquid petroleum gas (LPG) could be used as a compliance option. Thus, this analysis assumes that there could be an increased demand for LPG as a combustion fuel. Propane is an unregulated fuel in California (except for storage and safety issues) and no data are collected by the state on LPG sales or usage.

Propane-fueled vehicles are used primarily by fleet vehicles (e.g., state-owned vehicles). Propane vehicle conversions were negatively affected by the EPA's Addendum to Memorandum 1A, which led to decreases in the number of vehicle conversions. Therefore, without regulatory requirements or market incentives, the use of propane attributable to the 2016 AQMP control measures is not expected to be significant. Further, the supply of propane used in transportation is expected to be sufficient in the near future, both worldwide and in the United States, should LPG-fueled vehicles meet the applicable vehicle tailpipe standards.

4.2.4.43.5 Renewable Energy

A number of 2016 AQMP control measures would encourage the use of clean alternative fuels or the electrification of sources. For example, MOB-01, MOB-02, MOB-03, MOB-04, MOB-05, MOB-07, MOB-09, MOB-10, MOB-13, EGM-01, ORLD-01, ORLD-03, ORHD-02, ORHD-04,

PRHD-05, ORHD-06, ORHD-07,ORHD-08, ORHD-09, ORFIS-01, ORFIS-03,ORFIS-05, OFFS-01, OFFS-04, 0FFS-05, and OFFS-08 may result in the use of more electric or hybrid vehicles or equipment. While the primary method for control is expected to be electrification, alternative fuels may also be an option in some cases.

There are number of different types of renewable energy sources such as biomass, geothermal, hydroelectric, solar, and wind. With regard to the analysis of potential electricity impacts from the 2016 AQMP, refer to subsection 4.2.4.1. The 2016 AQMP control measures are aimed at incentivizing the use of near-zero and zero emission equipment which include vehicles, trucks, buses, and possibly other sources such as locomotive engines and marine ship engines at berth. The encouraged use of electricity is expected to result in potentially significant electricity impacts as more electrical capacity will be needed.

Large-scale renewable capacity of electricity generation has steadily increased from 6,600 MW in 2010 to nearly 14,300 MW in 2015. Since the end of 2010, 7,700 MW of large-scale (larger than 20 MW) renewable energy projects have become operational. Approximately 44 percent of the large-scale renewable projects operating in California from 2010 through 2015 is generated by wind power; 32 percent is generated by solar power, 20 percent is generated by geothermal, four percent is generated by biomass, and two percent is generated by small hydroelectric power (CEC, 2015l).

As of October 2015, more than 7,200 MW of distributed renewable energy generation capacity (projects smaller than 20 MW) was operating or installed in California. An additional 900 MW is pending California's existing programs to support renewable distributed generation, which if approved, could add another 2,200 MW when fully operational. Much of the nearly 1,700 MW of additional future capacity needed to achieve the 12,000 MW goal could occur through market mechanisms (CEC, 2015l). Table 4.2-8 provides a summary of the renewable projects that are currently online in California.

TABLE 4.2-8

Summary of Renewable Projects On-Line in Southern California (as of October 2015)

County	Biomass		Geothermal		Small Hydro		Solar PV		Solar Thermal		Wind		Total	
	No.	MW	No.	MW	No.	MW	No.	MW	No.	MW	No.	MW	No.	MW
Los Angeles	10	157			19	198	49	455	1	8			78	814
Orange	6	82			3	12							9	94
Riverside	3	59			6	50	17	618	1	250	33	713	59	1,683
San Bernardino	3	6			11	38	46	251	13	1,042	3	7	74	1,318
Total w/in Southern California	22	304			39	298	112	1,324	15	1,300	36	720	220	3,909
Total California	106	1,300	46	2,700	222	1,600	333	5,100	15	1,300	131	6,000	849	18,100

Source: CEC, 2015i

Past and current renewable distributed generation programs include utility fee-in tariffs along with state-mandated self-generation incentives such as the Self-Generation Incentive Program, the California Solar Initiative, the New Solar Homes Partnership, publicly owned electric utility solar programs, and the Emerging Renewables Program.

At the end of November 2015, approximately 11,800 MW of renewable capacity was permitted throughout California and these facilities could come on-line in the future. The CEC estimated that power purchase agreements had been secured for approximately 2,000 MW by projects with approved permits that are not yet on-line. Of the 2,000 MW with contracts, about half (1,080 MW) are expected to come on-line in 2016, almost all solar (CEC, 2015m).

Two control measures may affect biomass/biogas sources: BCM-04 and BCM-10. In particular, BCM-04 could result in the thermal gasification of manure which would potentially generate a biogas (e.g., methane gas similar to natural gas) for use in other processes, e.g., electricity production. BCM-10 could result in the anaerobic digestion of wastes which can also generate a usable biogas. Therefore, BCM-10 could result in an increase in biogas generation which could provide beneficial impacts to renewable energy sources.

The other 2016 AQMP control measures are not expected to have a significant adverse impact on any renewable fuel sources. Indirect impacts would include the increased use of electricity and potentially increasing the need to generate additional renewable energy sources to meet California's energy goals. California has an aggressive Renewables Portfolio Standard (RPS) with a requirement for using 20 percent of renewable energy by 2010, 33 percent by 2020, and 50 percent by 2030. California is ahead of schedule for meeting the RPS. The CEC estimates that nearly 25 percent of electricity in 2014 was from renewable energy generated by wind, solar, geothermal, biomass and hydroelectric sources (CEC, 2015m).

4.2.5 MITIGATION MEASURES

Mitigation measures are required since potentially significant impacts on electricity demand associated with the 2016 AQMP have been identified. As individual control measures are promulgated as new rules or rule amendments, specific mitigation measures will be identified as necessary to minimize electricity impacts. Mitigation measures are expected to include the following:

E-1 Project sponsors should pursue incentives to encourage the use of energy efficient equipment and vehicles and promote energy conservation.

E-2 Utilities should increase the capacity of existing transmission lines to meet forecast demand that supports sustainable growth, where feasible and appropriate, in coordination with local planning agencies.

E-3 Project sponsors should submit projected electricity calculations to the local electricity provider for any project anticipated to require substantial electricity consumption. Any infrastructure improvements necessary should be completed according to the specifications of the electricity provider.

E-4 Project sponsors should include energy analyses in environmental documentation (e.g., CEQA document) with the goal of conserving energy through the wise and efficient use of energy.

E-5 Project sponsors should evaluate the potential for reducing peak energy demand by encouraging the charging of electrical vehicles and other mobile sources during off-peak hours.

E-6 Project sponsors should evaluate the potential for reducing peak energy demand by encouraging the use of catenary or way-side electrical systems developed for transportation systems to operate during off-peak hours.

E-7 Project sponsors should evaluate the potential for reducing peak energy demand by encouraging the use of electrified stationary sources during off-peak hours (e.g., cargo handling equipment).

4.2.6 IMPACTS AFTER MITIGATION

The 2016 AQMP will result in less than significant impacts to the increased demand of alternative fuels, alternative energy, renewable energy, petroleum fuels, and natural gas. However, the electricity consumption impacts are significant because the potential 2024 electricity usage increase would exceed baseline electricity consumption by 7.8 to 12.7 percent. Even with implementation of the above mitigation measures, electricity consumption impacts would remain significant.

4.3 HAZARDS AND HAZARDOUS MATERIALS

4.3.1 INTRODUCTION

This subchapter examines hazards and hazardous materials impacts associated with implementing the proposed control measures in the 2016 AQMP. All control measures in the 2016 AQMP were evaluated to determine whether they could generate direct or indirect hazards and hazardous materials impacts based on the anticipated methods of control. Hazards and hazardous materials impacts are related to the risks of explosions or the release of hazardous substances in the event of an accident or upset conditions.

The NOP/IS for the 2016 AQMP identified the following types of control measures as having potentially significant hazards and hazardous materials impacts: 1) use of reformulated coatings, solvents, and consumer products; 2) increase in the transportation and disposal of reformulated products; 3) the use of ammonia in selective catalytic reduction (SCR) or selective non-catalytic reduction (SNCR) air pollution control technology; 4) use of alternative fuels; and, 5) use of catalysts. Although the NOP/IS concluded that there were no impacts from sites included on a list of hazardous materials sites that would create a hazard to the public and the environment, comments were received on the NOP/IS on this topic area. Therefore, an analysis of this topic area has also been included in this subchapter.

4.3.2 2016 AQMP CONTROL MEASURES WITH POTENTIAL HAZARDS AND HAZARDOUS MATERIALS IMPACTS

The 2016 AQMP strategy is to further the penetration of partial-zero and zero emission technologies. In particular, some control measures in the 2016 AQMP promote greater use of reformulated low VOC consumer products such as coatings, adhesives, solvents and lubricants, potentially resulting in additional hazards associated with their use while other control measures encourage the use of alternative fuels which could increase hazards associated with the use of these fuels. Each control measure proposed in the 2016 AQMP was evaluated and 37 control measures were identified as having potential adverse hazards and hazardous materials impacts. Table 4.3-1 contains a summary of the 2016 AQMP control measures which may result in the use of compliance options that could generate significant hazards and hazardous materials impacts.

TABLE 4.3-1

Control Measures with Potential Hazards and Hazardous Materials Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	HAZARD IMPACTS
CMB-05	Further NOx Reductions from RECLAIM Assessment (NOx)	Re-examination of the RECLAIM program, including voluntary opt-out and the implementation of additional control equipment and SCR or SNCR equipment	Potential hazards associated with the use of additional ammonia and ammonia slip emissions from operating SCR or SNCR equipment.
CTS-01	Further Emission Reductions from Coatings, Solvents, Adhesives, and Sealants (VOC)	Reformulation of coatings using different solvents, adhesives, and sealants to reduce VOC emissions.	Potential hazards associated with the reformulated coatings that may contain more flammable solvents.
FLX-02	Stationary Source VOC Incentives (VOC)	Use of replacement coatings, such as UV cured resins and coatings, super-compliant/ultra-low emission technologies and electrification in the place of combustion based equipment.	Potential hazard with substances in UV cured resins and replacement coatings.
BCM-04	Emission Reductions from Manure Management Strategies (NH3)	Acidifier application, manure removal, manure slurry injection, and feed additives to reduce ammonia in manure.	Potential hazards generated by acidifier application, manure removal, and manure slurry injection.
BCM-05	Ammonia Emission Reduction from NOx Controls (NH3)	Installation and use of advanced catalyst technology for the conversion of ammonia.	Use of new catalysts could generate potential hazards.
BCM-08	Further Emission Reductions from Agricultural, Prescribed, and Training Burning (PM)	Incentivize chipping/grinding or composting in the place of agricultural burning as well as the increased utilization of clean fuels for training burns.	Increased utilization of clean fuels for training burns could generate potential hazards.
MOB-01	Emission Reductions at Commercial Marine Ports (NOx, SOx, CO)	Financial incentives for cleaner vessels, vehicles, and use of alternative fuels or fuel additives at marine ports.	The use of alternative fuels and fuel additives can generate hazards.
MOB-02	Emission Reductions at Rail Yards and Intermodal Facilities (NOx, PM)	Acceleration of the penetration of zero and near-zero emission locomotives and the use of alternative fuels and fuel additives.	The use of alternative fuels and fuel additives can generate hazards.
MOB-03	Emission Reductions at Warehouse Distribution Centers (all pollutants)	Use of incentives, regulatory rules, and promotion of hybrid technologies to increase zero and near zero emission equipment in/around warehouse.	The use of alternative fuels and fuel additives can generate hazards.
MOB-04	Emission Reductions at Commercial Airports (all pollutants)	Incentivizing zero and near-zero technologies like alternative fuels, diesel PM filters, and low-emitting engines.	The use of alternative fuels and fuel additives can generate hazards.

TABLE 4.3-1 (cont.)

Control Measures with Potential Hazards and Hazardous Materials Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	HAZARD IMPACTS
MOB-05	Accelerated Penetration of Partial-Zero and Zero Emissions Vehicles (VOC, NOx, CO)	Acceleration of the penetration of zero and near-zero emission vehicles as well as the use of alternative fuels and fuel additives.	The use of alternative fuels and fuel additives can generate hazards.
MOB-07	Accelerated Penetration of Partial-Zero and Zero Emission Light-Heavy and Medium-Heavy Duty Vehicles (NOx, PM)	Acceleration of the penetration of zero and near-zero emission vehicles as well as the use of alternative fuels and fuel additives.	The use of alternative fuels and fuel additives can generate hazards.
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program (NOx, PM)	Incentivizing the use of zero emission technologies, the building of electric or magnetic power into roadway infrastructure to reduce emissions.	The use of alternative fuels and fuel additives can generate hazards.
MOB-10	Extension of the SOON Provision for Construction/Industrial Equipment (NOx)	Incentivizing SOON program and phasing in vehicles that meet Tier 4 standards in place of older, high emitting equipment.	The use of alternative fuels and fuel additives can generate hazards.
MOB-13	Off-Road Mobile Source Emission Reduction Credit Generation Program (NOx, SOx, PM)	Acceleration of the penetration of zero and near-zero off-road mobile sources as well as the use of alternative fuels and fuel additives to reduce emissions	The use of alternative fuels and fuel additives can generate hazards.
MOB-14	Emissions Reductions from Incentives Programs (NOx, SOx, PM)	Implementation of the Prop 1B and Carl Moyer Programs to accelerate the penetration of clean air vehicles.	Increased utilization of clean air vehicles could generate potential hazards.
EGM-01	Emission Reductions from New Development or Redevelopment Projects (all pollutants)	Accelerating the penetration of zero and near-zero emission technologies and the use of things like dust control, alternative fuels, diesel PM filter, low-emitting engines, low VOC materials and mitigation fees.	The use of alternative fuels and fuel additives can generate hazards as well as hazards that arise from dust control.
TXM-08	Control of Emissions from Chemical Stripping of Cured Coatings (Methylene Chloride)	Reformulation of solvents and use of activated carbon.	Potential hazards generated from the reformulated solvents that may contain more flammable substances.
ORLD-01	Advanced Clean Cars 2 (NOx, ROG)	Expanded/new standards for clean cars including the use of alternative fuels and fuel additives.	The use of alternative fuels and fuel additives can generate hazards.

TABLE 4.3-1 (cont.)

Control Measures with Potential Hazards and Hazardous Materials Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	HAZARD IMPACTS
ORLD-03	Further Deployment of Cleaner Technology: On-Road Light-Duty Vehicles (NOx, ROG)	Acceleration of the penetration of zero and near-zero emission vehicles, including those vehicles that use alternative fuels and fuel additives.	The use of alternative fuels and fuel additives can generate hazards.
ORHD-02	Low-NOx Engine Standards (NOx)	Implementation of technologies to reduce emissions from heavy duty engines including the use of alternative fuels and fuel additives.	The use of alternative fuels and fuel additives can generate hazards.
ORHD-04	Advanced Clean Transit (NOx, ROG)	Implementation of technologies to accelerate the penetration of zero and near-zero emission buses into the fleet, including the use of alternative fuels.	The use of alternative fuels and fuel additives can generate hazards.
ORHD-05	Last Mile Delivery (NOx, ROG)	Acceleration of the penetration of zero and near-zero emission last mile delivery trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	The use of alternative fuels and fuel additives can generate hazards.
ORHD-06	Innovate Technology Certification Flexibility (NOx)	Acceleration of the penetration of zero and near-zero emission heavy duty trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	The use of alternative fuels and fuel additives can generate hazards.
ORHD-07	Zero Emission Airport Shuttle Buses (NOx, ROG, PM2.5)	Implementation of technologies to accelerate the penetration of zero and near-zero emission airport shuttles, including the use of alternative fuels.	The use of alternative fuels and fuel additives can generate hazards.
ORHD-08	Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission heavy duty vehicle engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	The use of alternative fuels and fuel additives can generate hazards.

TABLE 4.3-1 (concluded)

Control Measures with Potential Hazards and Hazardous Materials Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	HAZARD IMPACTS
ORHD-09	Further Development of Cleaner Technology: On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	The use of alternative fuels and fuel additives can generate hazards.
ORFIS-01	More Stringent National Locomotive Standards (NOx, ROG)	Use of Tier 5 Control equipment such as SCRs, alternative fuels, DPM filters and electric batteries.	Potential hazards associated with the use of additional ammonia and ammonia slip emissions from operating SCR equipment, and the use of alternative fuels and fuel additives.
ORFIS-03	Incentivize Low Emission Efficient Ship Visits (NOx, PM)	Incentives for the use of control equipment such as SCRs.	Potential hazards associated with the use of additional ammonia and ammonia slip emissions from operating SCR equipment.
ORFIS-04	At-Berth Regulation Amendments (NOx, ROG)	Further reduce emissions from ships at berth and advance the use of near-zero and zero emission technologies	Potential hazards associated with the use of additional ammonia and ammonia slip emissions from operating SCR equipment.
ORFIS-05	Further Deployment of Cleaner Technology: Off-Road Federal and International Sources (NOx, ROG)	Measure to accelerate deployment of cleaner marine, rail and aircraft off-road technology by increasing incentive program.	The use of alternative fuels and fuel additives can generate hazards.
OFFS-01	Zero-Emission Off-Road Forklift Regulation Phase 1 (NOx, ROG)	Measure to accelerate the penetration of zero emission technologies to be used in off road forklifts.	The use of alternative fuels and fuel additives can generate hazards.
OFFS-04	Zero-Emission Airport Ground Support Equipment (NOx, ROG, PM2.5)	Measure to accelerate the penetration of zero emission technologies to be used in airport ground support equipment.	The use of alternative fuels and fuel additives can generate hazards.
OFFS-05	Small Off-Road Engines (NOx, ROG)	Measure to accelerate the penetration of zero emission technologies to be used in small off-road engines.	The use of alternative fuels and fuel additives can generate hazards.
OFFS-07	Low Emission Diesel Requirement (NOx, PM)	Reformulation of diesel fuel to lower amount of emissions.	The use of alternative fuels and fuel additives can generate hazards.
OFFS-08	Further Deployment of Cleaner Technologies: Off-Road Equipment (NOx, ROG, PM2.5)	Measure to accelerate the implementation of zero emission technologies in off-road equipment.	The use of alternative fuels and fuel additives can generate hazards.
CPP-01	Consumer Products Program (ROG)	Reformulation of consumer products.	Hazards could be generated by the use of reformulated products that may contain more toxic or flammable solvents.

4.3.3 SIGNIFICANCE CRITERIA

The NOP/IS concluded that the 2016 AQMP would not: 1) result in safety hazards for people residing or working in the project area due to proximity to a public use or private airport; 2) impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or, 3) expose people or structures to a significant risk of loss, injury or death involving wildland fires. However, implementation of the 2016 AQMP would be considered to have significant adverse hazards and hazardous material impacts if any of the following conditions occur:

- Non-compliance with any applicable design code or regulation.

- Non-conformance to National Fire Protection Association standards.

- Non-conformance to regulations or generally accepted industry practices related to operating policy and procedures concerning the design, construction, security, leak detection, spill containment or fire protection.

- Exposure to hazardous chemicals in concentrations equal to or greater than the U.S. EPA's Emergency Response Planning Guideline (ERPG) 2 levels.

4.3.4 IMPACT ANALYSIS

4.3.4.1 Reformulated Coatings, Solvents, Adhesives, and Sealants

The 2016 AQMP control measure that could require the reformulation of coatings, adhesives, and solvents is CTS-01. To meet the lowered future VOC content limits, these products are expected to be reformulated. While reformulated products would be expected to have lower VOC contents, the reformulations could have widely varying flammability and health effects, depending on the chemical characteristics of the replacement solvents contained in the reformulated products. While most reformulations are expected to be made with water, which is not flammable or hazardous and does not have adverse health impacts, other reformulations could be made with a solvent that may be exempt from the definition of a VOC in SCAQMD Rule 102 – Definition of Terms, but still have hazardous properties. For example, acetone is a Group I exempt compound because of its low reactivity and is frequently used in reformulated products, but it is extremely flammable. In addition, coatings, solvents, adhesives, and sealants can also be reformulated with other solvents that are not necessarily exempt from the definition of a VOC, but that also have flammability and potential health effects issues.

Table 4.3-2 identifies a list of typical conventional solvents and possible replacement solvents that may be used in the manufacture of coatings, solvents, adhesives, and sealants along with their chemical characteristics pertaining to whether each substance is fire hazard.

As illustrated in Table 4.3-2, the flammability classifications by the National Fire Protection Association (NFPA) are the same for acetone as well as for other conventional solvents that are currently used in existing formulations such as tertiary butyl acetate (tBAc), toluene, xylene, methyl ethyl ketone (MEK), isopropanol, butyl acetate, and isobutyl alcohol. Because acetone has the lowest flash point of all the chemicals listed, from a flammability perspective, reformulations made with acetone would represent the worst-case. However, it is important to note that acetone also has one of the highest Lower Explosive Level (LEL), 2.6 percent by volume, which means that acetone vapors will not cause an explosion unless the vapor concentration exceeds 26,000 ppm.

In contrast, a conventional solvent such as toluene can cause an explosion at 1.3 percent by volume or 13,000 ppm, which poses a much greater risk of explosion when compared to acetone. Similarly, the concentration of xylene, another conventional solvent, can cause an explosion at even lower concentrations than toluene at 1.0 percent by volume or 10,000 ppm. However, facility operators are required to follow operating guidelines when working with flammable chemicals. These guidelines specify well-ventilated areas, as prescribed by the fire department codes, so that LEL concentrations would be avoided when working with flammable chemicals.

While a "worst-case" flammability scenario could be that all of the affected 2016 AQMP coatings, solvents, adhesives, and sealants would be reformulated with acetone to meet the interim and final VOC content limits, most future reformulated products will likely be reformulated using primarily water due to its lower cost. Water-based coatings are generally not flammable and typically have a lower NFPA classification and a lower Consumer Product Safety Commission classification, when compared to coatings formulated with conventional solvents.

Chemistry classes at all levels from grade school to universities, as well as industrial laboratories, use acetone for wiping down counter tops and cleaning glassware. Additional uses for acetone include solvent for paint, varnish, lacquers, inks, adhesives, floor coatings, and cosmetic products including nail polish and nail polish remover. Further, it is currently used widely in coating and solvent formulations.

Labels and Material Safety Data Sheets (MSDSs) accompanying acetone-based products caution the user regarding acetone's flammability and advise the user to "*keep the container away from heat, sparks, flame and all other sources of ignition. The vapors may cause flash fire or ignite explosively. Use only with ventilation*." All of the large coating manufacturers currently offer pure acetone for sale with similar warnings. The Uniform Fire Code (UFC) treats solvents such as acetone, butyl acetate, and MEK as Class I Flammable Liquids. Further, the UFC considers all of these solvents to present the same relative degree of fire hazard (SCAQMD, 2003).

A list of conventional and potential replacement solvents and their related health hazards information are shown in Table 4.3-3. As illustrated in Table 4.3-3, some of the potential replacement solvents have lower or less severe threshold limit values (TLVs), permissible exposure levels (PELs), or immediately dangerous to life or health concentrations (IDLHs) than some of the conventional solvents. For example, acetone would be considered to have less health hazards than all of the conventional solvents listed. However, there are some replacement solvents that could have higher, more severe, or unknown toxicological effects. For example, the diisocyanate group of solvents appear to have more severe toxicological effects than the listed traditional solvents.

TABLE 4.3-2

Chemical Characteristics for Conventional and Potential Replacement Coating Solvents

CAS No.	Chemical Compound	Auto-ignition Temperature (°F)	Boiling Point (@760 mmHg, °F)	Evaporation Rate @ 25 °C (Butyl Acetate = 1)	Flash Point (°F)	LEL/ UEL [a] (% by Vol.)	Vapor Pressure (mmHg @ 20 °C)	NFPA Flammability Rating [b]	Flammability[c]
Conventional Solvents									
67-64-1	Acetone	538	56	6.1	-4	2.6/12.8	180	3	Extremely Flammable
80-05-7	Bisphenol A	N/A	428	N/A	N/A	N/A	N/A	0	N/A
123-86-4	n-Butyl acetate	N/A	257	1	73	1.7/7.6	15	3	Extremely Flammable
111-79-2	2-Butoxyethanol	471.2	340.7	N/A	141.8	1.1/12.7	0.8	2	Combustible
78-92-2	sec-Butyl alcohol	N/A	208	N/A	81	1.7/9.8	11.5	3	Flammable
108-94-1	Cylohexane	788	312.1	N/A	111	1.1/9.4	0.53	2	Combustible
25265-71-8	Diethylene glycol	444	471	N/A	255	1.6/10.8	1	1	Combustible
34590-94-8	Dipropylene glycol methyl ether	278.6	408	N/A	180	1.1/3	0.5	3	Combustible
29911-28-2	Dipropylene glycol monobutyl ether	N/A	441	N/A	205	N/A	0.06	1	Combustible
100-41-4	Ethylbenzene	809.6	276.8	0.84	70	0.8/7	6.75	3	Flammable
103-09-3	2-Ethylhexyl acetate	N/A	390	N/A	185	N/A	N/A	2	Combustible
107-21-1	Ethylene glycol	748	388	0.01	232	3.2/15.3	0.06	1	Combustible
109-59-1	Ethylene glycol isopropyl ether	N/A	109.5	N/A	109	1.6/13	2.6	2	Combustible
50-00-0	Formaldehyde	806	- 2	N/A	147	N/A	N/A	4	Combustible
78-83-1	Isobutyl alcohol	780	226	0.82	82	1.2/10.9	9	3	Flammable
108-21-4	Isopropyl acetate	N/A	109.5	N/A	39	1.8/8	47	3	Flammable
67-63-0	Isopropyl alcohol	399	180	2.3	53	2/12.7	33	3	Extremely Flammable
64742-95-6	Light aromatic hydrocarbons	880	335	0.3	180	0.6/7	11	2	Combustible
110-43-0	Methyl amyl ketone	N/A	301	N/A	106	1.1/7.9	2.14	2	Combustible
78-93-3	Methyl ethyl ketone	474	80	4	16	1.8/11.5	8.7	3	Extremely Flammable
108-10-1	Methyl isobutyl ketone	860	291	0.46	97	1/8.2	5	3	Flammable
107-87-9	Methyl n-propyl ketone	N/A	271.5	N/A	45	1.5/8.2	27	3	Flammable

TABLE 4.3-2 (Continued)

Chemical Characteristics for Conventional and Potential Replacement Coating Solvents

CAS No.	Chemical Compound	Auto-ignition Temperature (°F)	Boiling Point (@760 mmHg, °F)	Evaporation Rate @ 25 °C (Butyl Acetate = 1)	Flash Point (°F)	LEL/ UEL [a] (% by Vol.)	Vapor Pressure (mmHg @ 20 °C)	NFPA Flammability Rating [b]	Flammability[c]
Conventional Solvents									
64741-41-9	Mineral spirits (Stoddard)	232	154-188	0.1	109-113	1.0 / 7	1.1	2	Combustible[d]
64742-94-5	Heavy aromatic naphtha	830	719.6	>0.1	145	1.8/11.7	1	2	Combustible
91-20-3	Naphthalene	978.8	424	N/A	176	0.9/5.9	0.03	2	Combustible
8002-05-9	Petroleum distillate (Naphtha)	N/A	86-460	N/A	20 - 100	1.1/5.9	40	3	Extremely Flammable
108-88-3	Toluene	538	111	2	41	1.3/7	22	3	Flammable[d]
108-67-8	1,3,5-Trimethylbenzene	550	329	0.01	122	2.6/12.5	2	2	Combustible
95-63-6	1,2,4-Trimethylbenzene	932	337	0.01	112	0.9/6.4	1	2	Combustible
64742-89-8	V.M.&P Naphtha	288	266.9	1.2	53.1	1.2/6	20	3	Flammable
1330-20-7	Xylene	499	139	0.8	81	1.0/6.6	6	3	Flammable[d]
Potential Replacement Solvents									
67-64-1	Acetone	538	56	6.1	-4	2.6/12.8	180	3	Extremely Flammable
100-51-6	Benzyl alcohol	817	401	0.006	199	1.3/13	0.15	2	Combustible
71-36-3	n-Butanol	N/A	242.5	N/A	95	1.4/11.2	4	3	Flammable
123-86-4	n-Butyl acetate	N/A	257	1	73	1.7/7.6	15	3	Extremely Flammable
85-68-7	Butyl benzyl phthalate	797	698	N/A	390	N/A	8.6E-6	1	Combustible
616-38-6	Dimethyl carbonate	869	194	3.2	64	4.2/12.9	42	3	Flammable
108-01-0	2-Dimethylaminoethanol	455	282	N/A	104	1.6/11.9	3.18	2	Combustible
117-81-7	Dioctyl phthalate	735	446	N/A	405	0.3/	< 0.01	1	Combustible
25265-71-8	Dipropylene glycol	590	449	N/A	250	2.9/12.6	0.03	1	Combustible
763-69-9	Ethyl 3-Ethoxypropionate	N/A	338	N/A	138	N/A	< 1	2	Combustible
141-78-6	Ethyl acetate	800	171	N/A	25	2.2/9	73	3	Extremely Flammable
64-17-5	Ethyl alcohol	685	173	1.4	55	3.3/19	44	3	Extremely Flammable
111-76-2	Ethylene glycol monobutyl ether	460	340	0.07	144	1.1/12.7	0.8	2	Combustible
111-80-5	Ethylene glycol monoethyl ether	455	275	0.41	120	1.7/15.6	4	2	Combustible
109-86-4	Ethylene glycol monomethyl ether	545	256	0.53	100	1.8/19.8	6	2	Combustible

TABLE 4.3-2 (Concluded)

Chemical Characteristics for Conventional and Potential Replacement Coating Solvents

CAS No.	Chemical Compound	Auto-ignition Temperature (°F)	Boiling Point (@760 mmHg, °F)	Evaporation Rate @ 25 °C (Butyl Acetate = 1)	Flash Point (°F)	LEL/ UEL [a] (% by Vol.)	Vapor Pressure (mmHg @ 20 °C)	NFPA Flammability Rating [b]	Flammability[c]
Potential Replacement Solvents (continued)									
2807-30-9	Ethylene glycol monopropyl ether	455	300	0.22	124	1.3/15.8	1.3	2	Combustible
149-57-5	2-Ethylhexanoic acid	699	442	N/A	244	1/8.6	< 0.01	1	Combustible
822-06-0	Hexamethylene diisocyanate	N/A	415	N/A	284	1/	0.5	1	Combustible
64742-53-6	Hydrotreated light naphthenic distillate	>600	500	N/A	295	N/A	0.04	1	Combustible
79-20-9	Methyl acetate	501	135	5.3	14	3.1/16	173	3	Extremely Flammable
96-29-7	Methyl ethyl ketoxime	N/A	306	N/A	1380	N/A	0.9	2	Combustible
101-68-8	Methylene bisphenyl diisocyanate	464	597	N/A	390	N/A	5E-6	1	Combustible
98-56-6	Parachlorobenzotrifluoride	>500	282	0.9	109	0.9/10.5	5.3	1	Combustible
57-55-6	Propylene glycol	700	370	0.01	210	2.6/12.5	0.08	1	Combustible
108-65-6	Propylene glycol monomethyl ether acetate	N/A	294	N/A	109	1.1/13.1	2.53	2	Combustible
770-35-4	Propylene glycol phenyl ether	923	469	0.002	239	0.8/6.0	0.01	3	Flammable
1569-01-3	Propylene glycol propyl ether	N/A	302	N/A	118	N/A	N/A	2	Combustible
100-42-5	Styrene	914	293	0.5	88	1.1/6.1	4.5	3	Flammable
540-88-5	Tertiary butyl acetate	N/A	208	2.8	62	1.5 /N/A	N/A	3	Flammable
25265-77-4	Texanol	730	471	< 0.01	248	0.6/4.2	0.01	1	Combustible
26471-62-5	Toluene diisocyanate	1148	478	N/A	250	0.9/9.5	0.025	1	Combustible
121-44-8	Triethylamine	480	194	5.6	16	1.2/8.0	57.1	3	Extremely Flammable
144-19-4	Trimethyl 1,3-pentanediol	572	450	N/A	235	N/A	N/A	1	Combustible

[a] Lower Explosive Limit / Upper Explosive Limit

[b] NFPA Flammability Rating: 0 = Not Combustible; 1 = Combustible if heated; 2 = Caution: Combustible liquid flash point of 100° to 200°F; 3 = Warning: Flammable liquid flash point below 100°F; 4 = Danger: Flammable gas or extremely flammable liquid

[c] The Consumer Products Safety Commission (CPSC) has Labeling and Banning Requirements for Chemicals and Other Hazardous Substances which are located in 15 U.S.C.§1261 and 16 CFR Part 1500. Specifically, the flammability of a product is defined in 16 CFR Part 1500.3 (c)(6) and is based on flash point. For example, a flammable liquid needs to be labeled as: 1) "Extremely Flammable" if the flash point is below 20 °F; 2) "Flammable" if the flash point is above 20 °F but less than 100°F; or, 3) "Combustible" if the flash point is above 100 °F up to and including 150 °F.

[d] Requires Special Hazards Labeling per 16 CFR Part 1500.14 (a)(3) & (b)(3)

TABLE 4.3-3

Health Hazards of Conventional and Potential Replacement Solvents

CAS No.	Chemical Compound	NFPA Health Rating [a]	TLV (ACGIH)[b] (ppm)	PEL (OSHA) [c] (ppm)	IDLH (NIOSH)[d] (ppm)	Health Effects
Conventional Solvents						
67-64-1	Acetone	1	500	1,000	2,500	Mild irritation - eye, nose, throat, skin; narcosis
80-05-7	Bisphenol A	2	N/A	N/A	N/A	Mild irritation - eyes and skin
123-86-4	n-Butyl acetate	2	150	150	1,700	Moderate irritation – eye, nose, throat; narcosis
111-79-2	2-Butoxyethanol	1	20	50	5	Mild irritation - eyes, skin and respiratory
78-92-2	sec-Butyl alcohol	2	100	150	2,000	Mild irritation - eye, nose, throat, skin; narcosis
108-94-1	Cyclohexane	2	20	50	700	Moderate irritation- eye, skin, nose and throat
25265-71-8	Diethylene glycol	1	N/A	N/A	N/A	Mild irritation - eyes and skin
34590-94-8	Dipropylene glycol methyl ether	0	100	100	100	Mild irritation – eye, skin, respiratory, digestion
29911-28-2	Dipropylene glycol monobutyl ether	1	N/A	N/A	N/A	Potential severe irritation to eyes, nose and throat; moderate skin and digestion irritation
100-41-4	Ethylbenzene	2	100	100	800	Moderate irritation – eye, skin, nose, throat
103-09-3	2-Ethylhexyl acetate	2	N/A	N/A	N/A	Mild irritation – eye, skin, respiratory, digestion
107-21-1	Ethylene glycol	2	100	50	N/A	Mild irritation – respiratory, skin, kidney, reproductive
109-59-1	Ethylene glycol isopropyl ether	2	25	25	N/A	Mild irritation – eye, skin, respiratory, digestion
50-00-0	Formaldehyde	3	0.30	1	0.016	Irritation - skin, eyes, nose, and throat. High levels of exposure may cause some types of cancers.
78-83-1	Isobutyl alcohol	1	50	100	8,000	Mild irritation – eye, nose, throat; suspect carcinogen
108-21-4	Isopropyl acetate	1	100	250	1,800	Mild irritation – eye, skin, nose, throat
67-63-0	Isopropyl alcohol	1	200	400	2,000	Mild irritation – eyes, nose, throat; narcosis
64742-95-6	Light aromatic hydrocarbons	2	10-100	10-100	25-100	Mild irritation – eye, skin, respiratory, digestion
110-43-0	Methyl amyl ketone	1	50	100	100	Mild irritation - eyes and skin
78-93-3	Methyl ethyl ketone	1	200	200	3,000	Mild irritation – eye, nose, throat; narcosis; skin
108-10-1	Methyl isobutyl ketone	2	50	50	50	Potential serious eye irritation; mild skin and respiratory irritation
107-87-9	Methyl n-propyl ketone	2	150	200	150	Moderate irritation – eye, skin, respiratory

TABLE 4.3-3 (Continued)

Health Hazards of Conventional and Potential Replacement Solvents

CAS No.	Chemical Compound	NFPA Health Rating [a]	TLV (ACGIH)[b] (ppm)	PEL (OSHA) [c] (ppm)	IDLH (NIOSH)[d] (ppm)	Health Effects
Conventional Solvents						
64741-41-9	Mineral spirits (Stoddard)	1	100	500	5,000	Narcosis; mild irritant
64742-94-5	Heavy aromatic naphtha	2	N/A	N/A	N/A	Mild irritation – eye, skin, respiratory, digestion
91-20-3	Naphthalene	4	10	10	10	Moderate irritation - eye, skin; fatal if inhaled
8002-05-9	Petroleum distillate (Naphtha)	1	400	500	1,100	Mild irritation; narcosis
108-88-3	Toluene	2	50	200	500	Moderate irritation – eye, nose, throat; narcosis; skin; suspect teratogen; mutagen, nervous system
108-67-8	1,3,5-Trimethylbenzene	2	25	25	25	Mild irritation - skin, eye; harmful if inhaled
95-63-6	1,2,4-Trimethylbenzene	2	25	25	25	Mild irritation - skin; serious irritation- eye; harmful if inhaled
64742-89-8	V.M.&P Naphtha	1	300	500	N/A	Mild irritation - skin, eye
1330-20-7	Xylene	2	100	100	1,000	Mild irritation – eye, nose, throat; narcosis; skin
Potential Replacement Solvents						
67-64-1	Acetone	1	500	1,000	2,500	Mild irritation - eye, nose, throat, skin; narcosis
100-51-6	Benzyl alcohol	2	N/A	N/A	N/A	Mild irritation - skin, respiratory; severe eye and ingestion irritation
71-36-3	n-Butanol	2	20	100	1,400	Potential severe irritation to eyes, nose and throat; moderate skin, digestion and respiratory irritation
123-86-4	n-Butyl acetate	2	150	150	150	Mild irritation - skin, eye, respiratory, digestion
85-68-7	Butyl benzyl phthalate	1	N/A	N/A	N/A	Mild irritation - eye, nose, throat, skin
108-01-0	2-Dimethylaminoethanol	3	N/A	N/A	N/A	Potential severe irritation to eyes, skin, throat and digestion; high risk to unborn child
616-38-6	Dimethyl carbonate	0	N/A	N/A	N/A	Mild irritation - respiratory, skin, eye, digestive
117-81-7	Dioctyl phthalate	0	N/A	N/A	N/A	Mild irritation - respiratory, skin, eye, digestive
25265-71-8	Dipropylene glycol	1	N/A	N/A	N/A	Mild irritation - respiratory, skin, eye, digestive, nausea, dizziness; may cause liver and kidney damage
763-69-9	Ethyl 3-Ethoxypropionate	1	0.3	N/A	0.01	Mild irritation - respiratory, skin, eye, digestive

TABLE 4.3-3 (Continued)

Health Hazards of Conventional and Potential Replacement Solvents

CAS No.	Chemical Compound	NFPA Health Rating [a]	TLV (ACGIH)[b] (ppm)	PEL (OSHA) [c] (ppm)	IDLH (NIOSH)[d] (ppm)	Health Effects
Potential Replacement Solvents						
141-78-6	Ethyl acetate	1	400	400	400	Mild irritation - respiratory, skin, eye, digestive; may cause acute inhalation
64-17-5	Ethyl alcohol	2	1,000	1,000	1,000	Mild irritation - respiratory, skin, eye, digestive
111-76-2	Ethylene glycol monobutyl ether	2	20	50	700	Mild irritation – eye, nose, throat; anemia; skin
111-80-5	Ethylene glycol monoethyl ether	2	5	200	500	Cumulative blood damage; moderate irritation of eyes, throat, skin
109-86-4	Ethylene glycol monomethyl ether	2	5	25	N/A	Cumulative CNS; skin; suspect reproductive effects; blood disorders
2807-30-9	Ethylene glycol monopropyl ether	2	N/A	N/A	N/A	Mild irritation - eye, nose, skin, respiratory, digestive
149-57-5	2-Ethylhexanoic acid	2	N/A	N/A	N/A	Mild irritation - eye, nose, skin, respiratory, digestive
822-06-0	Hexamethylene diisocyanate	4	0.005	N/A	0.005	Potential fatality if inhaled; moderate skin, eye irritation; toxic if swallowed
64742-53-6	Hydrotreated light naphthenic distillate	1	N/A	N/A	N/A	Mild irritation - eye, skin, respiratory, digestive
79-20-9	Methyl acetate	2	200	200	200	Mild irritation - eye, nose, skin, respiratory, digestive
96-29-7	Methyl ethyl ketoxime	2	N/A	N/A	N/A	Mild irritation - eye, nose, skin, respiratory, digestive
101-68-8	Methylene bisphenyl diisocyanate	3	0.01	0.02	40	Mild irritation – respiratory
98-56-6	Parachlorobenzotrifluoride	2	N/A	N/A	N/A	Mild irritation - eye, nose, respiratory, digestive
57-55-6	Propylene glycol	0	100	100	N/A	Mild irritation – slight eye, anesthesia
108-65-6	Propylene glycol monomethyl ether acetate	1	N/A	N/A	N/A	Mild irritation - eye, nose, skin, respiratory, digestive
770-35-4	Propylene glycol phenyl ether	2	N/A	N/A	N/A	Mild irritation - eye, nose, skin, respiratory, digestive
1569-01-3	Propylene glycol propyl ether	2	N/A	N/A	N/A	Mild irritation - eye, nose, skin, respiratory, digestive
100-42-5	Styrene	2	20	100	5,000	Mild irritation – eye, respiratory, neurotoxicity

TABLE 4.3-3 (Concluded)

Health Hazards of Conventional and Potential Replacement Solvents

CAS No.	Chemical Compound	NFPA Health Rating [a]	TLV (ACGIH)[b] (ppm)	PEL (OSHA) [c] (ppm)	IDLH (NIOSH)[d] (ppm)	Health Effects
Potential Replacement Solvents						
540-88-5	Tertiary butyl acetate	2	200	200	200	Mild irritation - eye, nose, skin, respiratory, digestive; prolonged exposure may cause dermatitis, blood effects, central nervous system and kidney problems
25265-77-4	Texanol	1	N/A	N/A	N/A	Mild irritation - eye, nose, skin, respiratory, digestive
26471-62-5	Toluene diisocyanate	3	0.005	0.02	10	Mild irritation – respiratory
121-44-8	Triethylamine	3	1	25	200	Mild irritation - eye; Cumulative eye, respiratory, and hematological effects.
144-19-4	Trimethyl 1,3-pentanediol	0	N/A	N/A	N/A	Mild irritation - eye, nose, skin, respiratory, digestive

[a] NFPA Health Rating: 0 = No unusual hazard; 1 = Caution: May be irritating; 2 = Warning: May be harmful if inhaled or absorbed; 3 = Warning: Corrosive or toxic. Avoid skin contact or inhalation; 4 = Danger: May be fatal on short exposure. Specialized protective equipment required.

[b] TLV = Threshold Limit Value, a recommended guideline established by the American Conference of Governmental Industrial Hygiene (ACGIH)

[c] PEL = Permissible Exposure Limit, established by OSHA

[d] IDLH = Immediately Dangerous to Life and Health, established by NIOSHA

In addition to the health hazard characteristics summarized in Table 4.3-3, there are several chemicals listed that are toxics, identified as TACs, including but not limited to the following: ethylbenzene, formaldehyde, MEK, methyl isobutyl ketone (MIBK), toluene, triethylamine, and xylene. Some of these TACs used in coatings are considered carcinogenic (cancer-causing) such as formaldehyde, while others may have other non-cancer health effects[1]. Thus, the use of materials that are toxic, carcinogenic, or could cause non-cancer health effects is of particular concern, in both existing formulations as well as in reformulated products, to the SCAQMD and other agencies such as U.S. EPA, CARB, OSHA, and OEHHA (which is part of the California Environmental Protection Agency (Cal/EPA)).

For these reasons, there are two local rules that regulate TAC emissions at facilities, including those using coatings: SCAQMD Rule 1401 – New Source Review of Toxic Air Contaminants, and SCAQMD Rule 1402 – Control of Toxic Air Contaminants From Existing Sources. Rule 1401 applies to new and modified facilities, including coating facilities, and Rule 1402 applies to facility-wide risk at existing facilities. Since the majority of coating facilities located within SCAQMD's jurisdiction are existing sources, the requirements in Rule 1402 are the main drivers for reducing overall risk and, therefore, TAC emissions from this industry.

For reasons of cost and to provide flexibility with stringent VOC content requirements for coatings, the SCAQMD has received requests to exempt two chemicals from the definition of a VOC in SCAQMD's Rule 102: t-butyl acetate (tBAc) and dimethyl carbonate (DMC). TBAc is not currently identified in any of SCAQMD's rules as a TAC. While tBAc has been delisted for automotive coatings as a VOC by the U.S. EPA[2], it has not been fully delisted as a VOC by CARB (automotive coatings) or by the SCAQMD. When delisting a compound from the definition of VOC, U.S. EPA only considers reactivity and does not address whether the compound is toxic, has global warming potential, or is an ozone depleting substance. Further, tBAc is not currently classified as a hazardous air pollutant under the federal Clean Air Act (CAA). While tBAc possesses a low photochemical reactivity as well as some other physical and chemical properties that are considered desirable by its manufacturer's representatives, tBAc may be unsuitable for consideration as a potential replacement for all conventional solvents because of tBAc's potential toxicity. Specifically, tBAc has the potential to form a metabolite called tert-butyl alcohol (TBA) which has cancer potency and acute non-carcinogenic values established by OEHHA. According to Acute Toxicity and Cancer Risk Assessment Values for TBA, (Budroe, et al., 2004), "tBAc should be considered to pose a potential cancer risk to humans because of the metabolic conversion to TBA."

To provide potential compliance flexibility while limiting use of tBAc because of the potential toxics concerns, , the SCAQMD incorporated limited use exemptions for tBAc in industrial

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1 Formaldehyde, toluene, triethylamine, and xylene are classified as having both chronic and acute health effects; ethylbenzene as having chronic health effects and zinc oxide proposed as having chronic health effects; MEK as having acute health effects with future proposed risk value for chronic; and, cobalt compounds as having future proposed risk values. In addition, MIBK is classified by U.S. EPA as a hazardous air pollutant (HAP), but the toxicology assessment is not finalized.

2 U.S. EPA. 2004. Revision to Definition of Volatile Organic Compounds – Exclusion of t-Butyl Acetate, 40 CFR Part 51, Federal Register 69298, November 29, 2004. (http://www.gpo.gov/fdsys/pkg/FR-2004-11-29/pdf/04-26069.pdf)

maintenance coatings and non-topcoats into Rule 1113 - Architectural Coatings, and Rule 1151 - Motor Vehicle and Mobile Equipment Non-Assembly Line Coating Operations, respectively.

DMC is also not currently identified in any of SCAQMD's rules as a TAC. The U.S. EPA revised the federal VOC definition to exclude DMC based on its negligible photochemical reactivity[3]. DMC is also currently not identified as a HAP under the federal CAA nor is it classified as an ozone depleting substance. No exposure guidelines have been established for DMC by the American Conference of Governmental Industrial Hygienists (ACGIH), or by the National Institute for Occupational Safety and Health (NIOSH). DMC is of concern because it forms a metabolite (an intermediate product of metabolism) consisting of methanol, which is a carcinogen.

Thus, when coatings and other products are reformulated as part of implementing the various control measures proposed in the 2016 AQMP, manufacturers could potentially use replacement chemicals that could pose new or different health risks, but SCAQMD Rules 1401 and 1402 would limit potential exposures to nearby receptors for manufacturers within the Basin. Further, as was the case with the limited use exemption of tBAc in Rules 1113 and 1151, future SCAQMD rulemaking would require individual evaluation of reformulations, the replacement chemicals and the corresponding potential health risks. Exposure typically occurs when applying the coatings, solvents, and adhesives.

When comparing the conventional solvents listed in Table 4.3-3, some of the replacement solvents (e.g., triethylamine) are likely to be present in trace amounts and accidental releases would be considered a one-time event that could be neutralized and cleaned up before all the solvent has evaporated, so no new chronic health risk is expected. No acute risk would be generated because the chemical would only be present in trace amounts. As shown in Table 4.3-3, the toxicity of replacement materials is generally less or no worse than conventional solvents overall but if a facility changes from using water-based products to using products that are reformulated with chemicals that may have new or different health hazards, significant adverse health hazard impacts could occur from using some low VOC reformulated products. However, as with the use of all chemicals, facilities and their workers would be required to continue to comply with existing health protective procedures when handling both flammable and toxic materials. In addition, any increase in the future use of low VOC compliant coating materials that are reformulated with water would be expected to result in a concurrent reduction in the number of accidental releases of high VOC coating materials. As a result, the net number of accidental releases would be expected to remain constant, allowing for population growth in southern California, or potentially be reduced.

Regarding fire hazards, if manufacturers use solvents such as Texanol, propylene glycol, etc., in future compliant water-borne coatings, significant adverse hazard impacts would not be expected to occur because these solvents are typically either equivalent or less flammable than conventional solvents based on NFPA ratings. However, if manufacturers reformulate with acetone, then more acetone-based and more extremely flammable products would be available on the market. Similarly, if manufacturers reformulate with products that have increased flammability than the

[3] U.S. EPA. 2009. Air Quality: Revision to Definition of Volatile Organic Compounds- Exclusion of Propylene Carbonate and Dimethyl Carbonate, 40 CFR Part 51, Federal Register 3437, January 21, 2009. (http://www.gpo.gov/fdsys/pkg/FR-2009-01-21/pdf/E9-1150.pdf

products manufactured with conventional solvents, an increased risk is expected during use of these products because consumers who may be familiar with using a higher VOC product with lower flammability, may be unaware that the reformulated products may have chemicals with increased flammability risk.

Lastly, in general, water-based coatings and products tend to contain less flammable and less toxic materials than solvent-based coatings and products. While the continued and potentially increased use of waterborne coatings and products would generally be expected to reduce the overall hazard impacts associated with solvent-based products, a switch from currently using water-based products to reformulated solvent-based products could offset any reduction realized. Without knowing how many facilities currently using water-based products would switch to using reformulated solvent-based products as a result of implementing the 2016 AQMP control measures, significant impacts on fire hazards associated with reformulated coatings, solvents, and consumer products could occur. While schools are generally not located in industrial areas, where the facilities that use or manufacture reformulated products are located, it is possible that there could be schools located within a quarter mile of a facility, creating a potential hazard to the school. Therefore, hazards and hazardous materials impacts associated with increased flammability of potential replacement solvents are concluded to be significant.

4.3.4.2 Use of Alternative Fuels

The 2016 AQMP would establish in-use strategies that may require or promote the use of alternative fuels including control measures MOB-01, MOB-02, MOB-03, MOB-04, MOB-05, MOB-07, MOB-09, MOB-10, MOB-13, EGM-01, ORLD-01, ORLD-3, ORHD-02, ORHD-04, ORHD-05, ORHD-06, ORHD-07, ORHD-08, ORH-09, ORFIS-01, ORFIS-05, OFFS-01, OFFS-04, OFFS-05, OFFS-07, and OFFS-08.

4.3.4.2.1 Ethanol/Ethanol Blends

Ethanol is a clear colorless organic liquid with physical and chemical properties which do not change from source to source like conventional fuels. In the U.S., ethanol is typically produced from corn or other grain products, while some imported ethanol is produced from sugar cane. For commercial or industrial use, pure ethanol (E100) is usually denatured with a small amount of gasoline or similar substance to avoid federal alcoholic beverage tax and intentional ingestion. Heavy duty vehicles use E95 (95 percent ethanol and five percent gasoline) or E93 (93 percent ethanol, five percent methanol, and two percent kerosene). Light and medium duty vehicles use E85 (85 percent ethanol and 15 percent gasoline). Vapors from ethanol blended fuels will exhibit similar flammability characteristics as gasoline. E85 is sold at 2,787 public stations located in 42 states, 96 of which are located in California (Alternative Fuels Data Center (AFDC), 2016).

Ethanol is shipped via rail to distribution terminals. In May 2015, the U.S. DOT issued revised rules to improve the safe transportation of large quantities of flammable materials by rail, including ethanol. The bulk transfer of ethanol from terminals is usually done in standard petroleum tanker trucks. Since the NFPA classification of ethanol is the same as gasoline or diesel (Class IB flammable liquid), there is no reason to expect that ethanol transport will be more dangerous than gasoline or diesel transport. There are, however, certain physical properties of ethanol that must be addressed during transport and storage when compared to gasoline or diesel. First, ethanol is incompatible with some types of materials used in petroleum storage and transfer systems; therefore, it is necessary to take some precaution to assure ethanol compatible materials are used. Second, E100 vapor/air mixtures at ambient temperatures and pressures can create a flammable mixture in the ullage space of a storage tank. Therefore, it is important to ensure that there are strong safeguards against any ignition sources inside tanks and that vent lines or other openings have flame arrestors. Furthermore, any fill lines must extend below the liquid ethanol level to provide a seal between an external ignition source and the vapor/air mixture in the tank. Ethanol blended fuel vapors are primarily composed of gasoline, and thus, the fire hazard associated with the transfer and storage of ethanol should be relatively the same as gasoline (DOT, 1999).

Compared with diesel fuel and gasoline, the following can be stated with respect to ethanol:

- Diesel fuel and gasoline contain components that are considerably more hazardous than ethanol. For example, diesel fuel contains highly toxic polynuclear aromatic hydrocarbons (PAHs) and gasoline contains an array of toxic compounds, including benzene, a known carcinogen;

- Diesel fuel and gasoline vapors are heavier than air (e.g., the specific gravity of air =1, gasoline = 3.4 and diesel > 4). Ethanol is heavier than air (e.g., specific gravity of ethanol = 1.6) but lighter than gasoline and diesel fuel and disperses more readily in air than gasoline or diesel fuel;

- Ethanol has a higher auto ignition temperature (684 degrees Fahrenheit [°F]) than diesel fuel (500 °F) or gasoline (500 °F);

- Ethanol is more difficult to ignite since it has a larger "lower flammability limit" 3.3 percent than gasoline (approximately one percent) or diesel fuel (0.5 percent);

- Unlike gasoline, ethanol can ignite in enclosed spaces such as fuel tanks since its upper flammability limit is 15 percent and it is heavier than air. For gasoline in a confined space, the vapor concentration exceeds the higher flammability limit (7.6 percent) and is therefore too high to ignite in the tank. Modifications such as materials inside the fuel tank that can arrest and quench flame propagation and as well as other modifications to isolate the tank from sparks and ignition sources are required to avoid ignition in the fuel tanks; and

- In case of fire, water can extinguish an ethanol fire, but it will make a gasoline or diesel fuel fire spread.

Based upon the preceding information, hazards associated with ethanol are approximately equivalent or less compared to conventional fuels. Therefore, increased usage of ethanol with a concurrent decline in usage of conventional fuels will not significantly alter existing hazards associated with mobile source fuels.

4.3.4.2.2 Compressed Natural Gas (CNG)

Natural gas is a mixture of hydrocarbons, mainly methane, that are in gaseous form at ambient temperature and pressure. It is also odorless and tasteless; therefore, an odorant is added so personnel in the vicinity of a leak can detect the presence of natural gas before it has reached the flammability limit in the area. Unlike other alternative fuels, natural gas already has an extensive distribution system and supply network. The issues of bulk transfer and storage are very different from other fuels, which are usually transported via tanker truck. CNG is generally produced onsite using compressors fed from a nearby natural gas pipeline. The typical range of methane in pipeline quality natural gas is approximately 80 to 95 percent. However, CARB has specified that the methane content to be greater than 88 percent for vehicular grade CNG. CNG is sold at 941 public stations in 45 states, 173 of which are in California (AFDC, 2016).

The SCAQMD has had a history of promoting the use of CNG in the past and few issues have arisen from the transport of CNG, as most refueling applications have relied on the existing natural gas pipeline infrastructure. Furthermore, CNG compositions and storage cylinders in vehicles follow NFPA 52 (CNG Vehicular Fuel Systems) and Society of Automotive Engineers (SAE) J1616 (Recommended Practice for CNG Fuel) specifications. These specifications limit the potential hazards of CNG leaks related to fuel storage and use in vehicles. Furthermore, natural gas has a higher flammability limit (five percent) than gasoline (one percent) or diesel (0.5 percent). Natural gas also has a lower ignition temperature (1,200 ºF) than gasoline or diesel (500 ºF). Other hazards associated with compressed fuels are projectiles from openings and freeze burns from rapid vaporization.

The main additional hazard associated with the use of CNG versus conventional fuels is the exposure to high pressures employed during storage, dispensing and operations. Due to these high pressures a large amount of gas could escape in a short amount of time and, if present under flammable conditions, could explode in the presence of an ignition source. Another potentially significant hazard is a release of natural gas during vehicle maintenance (DOT, 1999).

Compared with diesel fuel and gasoline, the following can be stated with respect to CNG:

- Diesel fuel and gasoline are toxic to the skin and lungs while CNG is not;

- Diesel fuel and gasoline vapors are heavier than air (e.g., specific gravity of air =1, gasoline = 3.4, and diesel fuel > 4). CNG is lighter than air (specific gravity = 0.55) and disperses more readily in air;

- CNG has a higher auto ignition temperature (1,200 ºF) than diesel fuel (500 ºF) or gasoline (500 ºF);

- CNG is more difficult to ignite since it has a larger “lower flammability limit” (5.3 percent) than gasoline (one percent) or diesel fuel (0.5 percent); and,

- Natural gas can be directly shipped via pipelines to the compressor station, rather than by on-road delivery trucks, and thus, has less delivery accident risk than vehicle shipments associated with gasoline and diesel fuel.

Based upon the preceding information, hazards associated with CNG are approximately equivalent or less compared to conventional fuels. Therefore, increased usage of CNG with a concurrent decline in usage of conventional fuels will not significantly alter existing hazards associated with mobile source fuels.

4.3.4.2.3 Liquefied Natural Gas (LNG)

Natural gas can be liquefied by refrigerating it below -160 degrees Celsius or -260 degrees Fahrenheit at relatively low pressure (20 to 150 psig). Like CNG, there are NFPA standards (NFPA 59A – Standards for Production, Storage, and Handling of LNG and NFPA 57 – Standard for LNG Vehicular Fuel Systems) for the handling, storage, production, and use of LNG, especially in vehicles. However, unlike CNG, most LNG is not generated on-site. Instead, LNG is typically delivered via insulated double walled tanker trucks to distribution facilities. The double walled construction of the LNG tanker trucks are more robust than standard petroleum tanker trucks; therefore, the transport of LNG is safer from spills and tank ruptures during accidents than conventional fuel tanker trucks.

The safety issues associated with LNG are similar to CNG, with the added hazards of handling a cryogenic liquid and the vaporization of the liquid. The cryogenic liquids have the potential to burn workers who come into contact with the liquid or uninsulated surfaces. This hazard can be mitigated by proper personal protective equipment and training. The vaporization of LNG in storage tanks can potentially cause a boiling liquid expanding vapor explosion (BLEVE). For a BLEVE to occur, there would need to be a catastrophic failure of all safety measures, including safety relief valves and burst discs, built into the vessel's design code.

The main additional hazard associated with the use of LNG versus conventional fuels are personal injuries from coming into contact with a cryogenic liquid and the potential for a large fire stemming from a release in the case of an accident (e.g., a tanker truck accident or storage tank failure). Another potentially significant hazard is a release of natural gas during vehicle maintenance (DOT, 1999).

Hazards associated with LNG are that, under certain conditions, it may explode or catch on fire. LNG is only explosive when confined and vapor concentrations are between five and 15 percent[4].

LNG is comprised mostly of methane, but may contain ethane, propane, and other heavier gaseous hydrocarbons. The main acute health effect associated with methane is asphyxia. Asphyxia is the condition of severely depleting the oxygen supply to the body. Methane causes asphyxia by displacing oxygen in air. Asphyxiation can occur when oxygen concentrations drop below 18 percent. The potential adverse health effects of oxygen deficiency are summarized in Table 4.3-4.

[4] Consumer Energy Center, http://www.consumerenergycenter.org/transportation/afvs/lng.html

TABLE 4.3-4

Effects of Oxygen Deficiency

Oxygen Concentration	Effects of Oxygen Deficiency
19%	Some adverse physiological effects occur, but they may not be noticeable.
15-19%	Impaired thinking and attention. Increased pulse and breathing rate. Reduced coordination. Decreased ability to work strenuously. Reduced physical and intellectual performance without awareness.
12-15%	Poor judgment. Faulty coordination. Abnormal fatigue upon exertion. Emotional upset.
10-12%	Very poor judgment and coordination. Impaired respiration that may cause permanent heart damage. Possibility of fainting within a few minutes without warning. Nausea and vomiting.
<10%	Inability to move. Fainting almost immediate. Loss of consciousness. Convulsions. Death

Source: Air Products and Chemicals, Inc., 2014.

It is unlikely that off-site receptors would be exposed to LNG concentrations that would generate adverse health effects, because the LEL for methane is five percent (50,000 ppm). The LEL is the concentration at which there is enough of the given gas to ignite or explode.

The methodology used for estimating the potential risk from a vapor explosion is that developed for off-site consequence analysis for the Risk Management Program (RMP) under 40 CFR 68 (EPA, 1999). For an RMP off-site consequence analysis, a gaseous release is assumed to produce a vapor explosion that results in a blast impact. For a vapor explosion, the significance level is a pressure wave (blast) of one pound per square inch (psi) and the metric examined is the modeled distance to the significant overpressure level.

Other safety issues associated with LNG are similar to those discussed previously for CNG, with the added hazards associated with handling a cryogenic liquid. The hazards posed by the use of LNG versus gasoline and diesel fuel are:

- Diesel fuel and gasoline are toxic to the skin and lungs and LNG is not;
- Diesel fuel and gasoline vapors are heavier than air (e.g., specific gravity of air = 1, gasoline = 3.4, diesel > 4). LNG is lighter than air (specific gravity = 0.55) and disperses more readily in air;
- LNG has a higher auto ignition temperature (1,200 ºF) than diesel (500 ºF) or gasoline (500 ºF). LNG is more difficult to ignite since it has a larger “lower flammability limit” (5.3 percent) than gasoline (one percent) or diesel fuel (0.5 percent);
- Cryogenic liquids such as LNG have the potential risk to workers of burns (frost-bite) that can be suffered if workers come in contact with the liquid or with surfaces that are not insulated. Proper safety equipment and training can minimize these hazards; and

- Since LNG is a cryogenic liquid, in the event of a release from an aboveground storage tank or tanker truck, a fraction of the liquid immediately flashes off to gas while the remainder will pool and boil violently emitting a dense vapor. The liquid transitions to a dense vapor and the dense vapor transitions to a gas as the liquid and vapor draw heat from the surroundings. If a source of ignition is present, the boiling liquid, vapor cloud and gas could explode and burn, threatening surrounding facilities and other storage vessels.

Based upon the preceding information, health hazards associated with LNG are approximately equivalent or less compared to conventional fuels. Therefore, increased usage of LNG with a concurrent decline in usage of conventional fuels will not significantly alter existing health hazards associated with mobile source fuels.

4.3.4.2.4 Liquefied Petroleum Gas (LPG)

LPG, also called propane, is a mixture of natural gases which are liquefied at ambient temperatures by compressing the gases to pressures above 120 psig. Propane is the major component of LPG, with the minor components being propylene, butane, and butene. In the U.S., almost all of the propane supply comes from stripping wellhead natural gas or as a by-product of petroleum refining. LPG for vehicle use is at least 95 percent propane and no more than 2.5 percent butane and heavier hydrocarbons. LPG has been used in fleet vehicles since the 1940s, so there is a substantial base of experience with LPG as an automotive fuel.

For a variety of reasons, however, LPG is not considered the alternative fuel of the future. Its place has been taken by natural gas. Consequently, there has been little development in dedicated LPG engine technology. On the other hand, other technologies and their emissions improved tremendously over the last decade. As a result of that development, some of the previous emission reduction advantages of LPG fuel, especially the low CO emissions, are now less pronounced[5]. Consequently, it is not likely that LPG would be used to any great extent in providing the fuel for near zero- or zero-emission technologies.

Since LPG is a compressed fuel, it has the physical hazards of projectiles, freeze burns, BLEVE, etc. However, since LPG is stored pressurized and at ambient temperatures, the physical hazards are not as high for storage and transport compared to compressed or liquefied natural gas (CNG or LNG). The flammability limit range for LPG is similar to gasoline, but the ignition temperature (920 ^{o}F) is higher than gasoline or diesel (500 ^{o}F). Therefore, the hazard from transport and storage of LPG should not be significantly different from the transport and storage of gasoline or diesel (DOT, 1999).

The main additional hazard associated with the use of LPG versus conventional fuels is the potential of a large fire stemming from a release in the case of an accident (e.g., a tanker truck accident).

Compared with diesel fuel and gasoline the following can be stated about LPG:

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[5] Net Technologies, Inc. How Clean Are LPG Engines. http://www.nett.ca/faq/lpg-3.html.

- Diesel fuel and gasoline are toxic to the skin and lungs and LPG is not;
- Diesel fuel and gasoline vapors are heavier than air (e.g., specific gravity of air =1, gasoline = 3.4, diesel fuel > 4.0). LPG is lighter than gasoline and diesel fuel but heavier than air (specific gravity = 1.52). It disperses more readily in air than gasoline or diesel fuel;
- LPG has a higher auto ignition temperature (920 ºF) than diesel fuel (500 ºF) or gasoline (500 ºF);
- LPG is more difficult to ignite since it has a larger "lower flammability limit" (2.0 percent) than gasoline (one percent) or diesel fuel (0.5 percent).

Based upon the preceding information, hazards associated with LPG are approximately equivalent or less as compared to conventional fuels. Therefore, increased usage of LPG with a concurrent decline in usage of conventional fuels will not significantly alter existing hazards associated with mobile source fuels.

4.3.4.2.5 Biodiesel/Renewable Diesel

Biodiesel is a fuel derived from biological sources such as vegetable oils or animal fats. The process for creating biodiesel involves mixing the oil with alcohol (e.g., methanol or ethanol) in the presence of a chemical such as sodium hydroxide. This process produces a methyl ester if methanol is used or an ethyl ester if ethanol is used. Methyl ester from soy beans is more economical to produce, and, therefore, is more common in the U.S. Biodiesel can be used pure (B100) or blended with conventional diesel. The most common blended biodiesel is B20, which is 20 percent biodiesel and 80 percent conventional diesel.

Renewable diesel is produced from non-petroleum renewable resources but is not a mono-alkyl ester. There are several different chemical approaches to producing renewable diesel. One is based on hydrotreating vegetable oils or animal fats. Hydrotreating frequently takes place in conventional refineries to reduce sulfur or aromatic hydrocarbon content in CARB diesel. A second method involves synthesis of hydrocarbons through enzymatic reactions. A third method involves partially combusting a biomass source to produce carbon monoxide and hydrogen (syngas) and utilizing the Fischer-Tropsch reaction to produce complex hydrocarbons. Compared to biodiesel, renewable diesel uses similar feedstocks but has different processing methods and can include chemically different components. Renewable diesel can be used pure (R100) or blended with conventional diesel. The most common blended renewable diesel is R20, which is 20 percent renewable diesel and 80 percent conventional diesel.

Biodiesel is significantly safer to store, handle and transport compared with petroleum diesel due to its low volatility, high flashpoint (266ºF), and low toxicity (US Dept. of Energy - http://www.afdc.energy.gov/fuels/biodiesel_benefits.html). The National Fire Protection Agency classifies biodiesel as a non-flammable liquid.

Biodiesel and renewable diesel are considered safer than conventional diesels; therefore, increased usage of biodiesel and renewable diesel with a concurrent decline in usage of conventional diesel will not significantly alter existing hazards associated with mobile source fuels.

4.3.4.2.6 Hydrogen

Hydrogen is the simplest, lightest and most plentiful element in the universe. In its normal gaseous state, hydrogen is colorless, odorless, tasteless, non-toxic and burns invisibly. Most hydrogen is made from natural gas through a process known as steam reforming. Reforming separates hydrogen from hydrocarbons by adding heat. Hydrogen can also be produced from a variety of sources including water and biomass. Hydrogen can be used as a combustion fuel or in fuel cell vehicles to produce electricity to power electric motors. Most automakers have placed fuel cell electric vehicles (FCEVs) with customers, or plan to introduce FCEVs to the early commercial market soon. By 2020, automakers expect to place tens of thousands of fuel cell electric vehicles in the hands of California consumers. Currently, about 300 FCEVs, which have been leased or joined fleet programs, have been placed on California's roads and fill at public and private hydrogen stations in the state (CARB, 2016a).

The generation and distribution of hydrogen as a consumer product is also still under development. Currently there are 26 hydrogen refueling stations in California, 20 of which have public access (California Fuel Cell Partnership, 2016). Most of the refueling stations depend on bulk liquid hydrogen delivery; however, a few hydrogen gas pipeline stations and on-site steam reformer stations exist. Furthermore, hydrogen is limited in its use as a transportation fuel. While hydrogen fuel cell technology is promising, its use in the future is dependent on many things (cost-effectiveness of the technology, availability of hydrogen, etc.), so that the extent to which it may be used in the future to replace petroleum fuels is currently unknown and, therefore, speculative. The physical hazards associated with bulk liquid transport and storage are similar to LNG, as they are both cryogenic liquids. The physical hazards associated with pipeline and steam reformer stations are similar to CNG, as they are both compressed gases. In general, the fire hazards associated with hydrogen spills or leaks is higher than conventional fuels. This is due to the wide flammability range and low ignition energy of hydrogen. However, hydrogen tanks are built to more rigorous standards than conventional fuel tanks, which reduces the likelihood of spills or leaks.

The main additional hazard associated with the use of hydrogen versus conventional fuels is the difficulty in seeing hydrogen fires and potentiality of a large fire stemming from a release in the case of an accident (e.g., a tanker truck accident). Another potentially significant hazard is a release of hydrogen in an enclosed space (e.g., garage or vehicle maintenance facility).

Compared with diesel fuel and gasoline, the following can be stated about hydrogen:

- Diesel fuel and gasoline are toxic to the skin and lungs and hydrogen is non-toxic and non-reactive, so if released, it does not present a health hazard to humans.

- Diesel fuel gasoline vapors are heavier than air (e.g., specific gravity of air = 1, gasoline = 3.4, diesel fuel > 4.0) while hydrogen is 14 times lighter than air. If released, hydrogen will quickly dissipate into the atmosphere.

- Hydrogen has an extremely low ignition energy requirement; about 20 microjoules can ignite hydrogen/air, which is about 10 times less than what is required to ignite a gasoline/air mixture (PNL, 2004).

- Hydrogen is clear, odorless, and tasteless. It burns with an extremely hot, but nonluminous flame which is difficult to see. The flame of burning hydrogen has few warning properties.

- Hydrogen has an unusually large flammability range and can form ignitable mixtures between four and 75 percent by volume in air. Given confinement and good mixing, hydrogen can be detonated over the range of 18 to 59 percent by volume in air.

Hydrogen is non-toxic and disperses more readily in air than gasoline or diesel. Based upon the preceding information, health hazards associated with hydrogen are approximately equivalent or less when compared to conventional fuels.

4.3.4.2.7 Electric/Hybrid

Electric (EVs) and hybrid vehicles (hybrids) both use electricity as part of their fuel system. EVs rely purely on electric power stored in batteries. Hybrids also use batteries as part of their fuel supply; however, hybrids supplement their electric demand by using gasoline engines to generate either mechanical or electric power on demand. Since gasoline is a conventional fuel, any difference in hazards associated with operating hybrid vehicles can be attributed to the batteries. The most common battery technologies used in modern EVs and hybrids are nickel-metal hydride (NiMH) and lithium ion (Li-ion) (AFDC, 2016a).

NiMH batteries can generate hydrogen gas if overcharged, which can lead to explosions without proper ventilation. In 1996, the International Center for Technology Assessment (ICTA) conducted a comprehensive review of the safety concerns associated with the use of EVs. The ICTA found risk of hydrogen emissions during stressful conditions; however, this risk has been virtually eliminated by the use of seals and proper valve regulation. By following the National Electric Codes (NECs) and the Society of Automotive Engineers (SAE) recommended safety practices and guidelines for the operation and maintenance of EVs and hybrids, any hydrogen gas risk during battery recharging would be eliminated (ICTA, 1996). There has been in a shift away from nickel metal hydride batteries in EV's to lithium-ion batteries (UN 2010).

Li-ion batteries can be fire hazards. There are a few reported cases of fires caused by Li-ion batteries in EVs. In response to these fires, the National Highway Traffic Safety Administration (NHTSA) performed an investigation on the fire hazards associated with Li-ion batteries in EVs. The NHTSA concluded that EVs do not pose a greater risk of fire than gasoline-powered vehicles. The NHTSA also developed an interim guidance, with the assistance of the NFPA, DOE, and others, to increase and identify the appropriate safety measures for handling an EV or hybrid automobile accident (NHTSA, 2012).

When Li-ion batteries are being charged, they can generate hydrogen gas that is explosive in certain concentrations. This hazard exists with lead-acid batteries as well as other types of batteries. Ventilation is the key to prevent the build-up of hydrogen gas during battery charging, as well as preventing any source of ignition (e.g., smoking) in the area where batteries are being charged. The hazards associated with charging Li-ion batteries are expected to be similar to the hazards associated with lead-acid batteries. The Society of Automotive Engineers has established a number of recommended practices that apply to the charging of batteries to assure adequate ventilation.

The hazards associated with Li-ion batteries have also included spontaneous combustion and related fire hazards. These hazards are usually associated with faulty construction or damage of the battery in the event of an accident. The National Highway Traffic Safety Administration (NHTSA) has investigated problems with Li-ion batteries and they have concluded that electric vehicles are not a greater risk for fire than gasoline-powered vehicles (NHTSA, 2011). The NHTSA has established safety precautions in the event of a crash involving an electric vehicle that include: 1) taking the same actions as a crash involving a gasoline-powered vehicle and exit the vehicle and move a safe distance away from the vehicle and notify authorities; 2) recommending that emergency responders disconnect the battery from an electric vehicle in the event of an accident; 3) applying large volumes of water if a fire is present; 4) storing damaged vehicles in an open area; and, 5) contacting vehicle dealers with questions regarding damaged electric vehicles (NHTSA, 2011). Overall, the fire hazards associated with an electric vehicle are expected to be less than a conventional vehicle because there would be no leak or spills of petroleum fuel (gas or diesel) that is flammable in the event of an accident.

Furthermore, all electrical propulsion vehicles must comply with Federal Motor Vehicle Safety Standard (FMVSS) 305. FMVSS 305 specifies performance requirements for limiting electrolyte spillage, retaining propulsion batteries, and electrically isolating the chassis from the high-voltage system during a crash event. FMVSS assures that accidents involving an EV or hybrid would cause no more electrical hazard than a gasoline- or diesel-powered vehicle.

Electric propelled vehicles are considered to be less hazardous than conventional fuel vehicles. The 2016 AQMP expects to replace between 600,000 and 750,000 conventional fuel vehicles with alternative fuel vehicles by 2025, which would generally result in a reduction in hazards associated with conventional fuel vehicles.

There are various existing regulations and recommended safety procedures that, when employed, will reduce hazards impacts associated with use of alternative clean fuels when compared to conventional fuels. Table 4.3-5 summarizes some of the regulations and safety procedures associated with use of alternative fuels. When affected vehicle owners and maintenance personnel comply with existing regulations and recommended safety procedures, hazards impacts associated with the use of alternative fuels will be the same or less than those of conventional fuels. Accordingly, significant hazards impacts are not expected from the implementation of the 2016 AQMP control measures that encourage the use of alternative fuels.

TABLE 4.3-5

Summary of Hazards and Existing Safety Regulations/Procedures Associated with Alternative Fuels

FUEL TYPE	HAZARD	REGULATION/PROCEDURE
Ethanol	Pure ethanol can ignite in enclosed spaces such as fuel tanks since its upper flammability limit is 19 percent and it is slightly heavier than air.	Modifications such as materials inside the fuel tank that can arrest and quench flame propagation and modifications to isolate the tank from sparks and ignition sources are required to avoid ignition in the fuel tanks.
CNG	CNG bottles are typically stored outside and are required to be above ground (NFPA 52) as opposed to below ground for gasoline or diesel tanks. There is a risk of vehicles colliding with the bottles causing a gas release.	Collisions can be minimized by installing curbing and bollards to protect the tanks from vehicle contact (LAFC57.42.16).
	Releasing gas in a maintenance shop can potentially create explosive hazards.	Installation of methane detection systems in the shop can provide early detection of leaks and alert the maintenance personnel. (If integrated with vent systems, vents are not required to operate continuously - CFC 2903.2.5). Ignition sources can be reduced/eliminated by ensuring that all electrical systems in the shop are explosion proof (smoking and open flames are prohibited under CFC 2901.7). Providing adequate ventilation can prevent the occurrence of explosive conditions (required under CFC 2903.1). Procedures can be established to ensure that all vehicles requiring maintenance are defueled and depressurized before admission to the maintenance depot.
LPG	LPG is typically stored outside and are required to be above ground (NFPA 58) as opposed to below ground for gasoline or diesel tanks. There is a risk of vehicles colliding with the bottles causing a gas release.	Collisions can be minimized by installing curbing and bollards to protect the tanks from vehicle contact (LAFC57.42.16).
	Releasing LPG in an enclosed area where there are potential ignition sources such as a maintenance shop may pose an explosive hazard. (A flammable concentration within an enclosed space in the presence of an ignition source can explode.)	Installation of flammable gas detection systems in a maintenance shop can provide early detection of leaks and alert the maintenance personnel (which is required for LPG under CFC2902.5). Ignition sources can be reduced/eliminated by ensuring that all electrical systems in the shop are explosion proof (smoking and open flames are prohibited under CFC 2901.7). Vehicle fuel shut-off valves shall be closed prior to repairing any portion of the vehicle fuel system (CFC2902.6).

TABLE 4.3-5 (Continued)

Summary of Hazards and Existing Safety Regulations/Procedures Associated with Alternative Fuels

FUEL TYPE	HAZARD	REGULATION/PROCEDURE
LNG	LNG is a cryogenic liquid and has the potential risk to workers of burns (frostbite) that can be suffered if workers come in contact with the liquid or with surfaces that are not insulated.	Proper safety equipment and training can mitigate these hazards.
	Releasing LNG in an enclosed area where there are potential ignition sources such as a maintenance shop may pose an explosive hazard. (A flammable concentration within an enclosed space in the presence of an ignition source can explode).	Installation of flammable gas detection systems in a maintenance shop can provide early detection of leaks and alert the maintenance personnel (which is required for LNG under CFC2903.3). Ignition sources can be reduced/eliminated by ensuring that all electrical systems in the shop are explosion proof (smoking and open flames are prohibited under CFC 2901.7). Providing adequate ventilation can prevent the occurrence of explosive conditions (required under CFC2903.1). Vehicle fuel shut-off valves shall be closed prior to repairing any portion of the vehicle fuel system (CFC2903.4.1). Vehicles fueled by LNG, which may have sustained damage to the fuel system, shall be inspected for integrity with a gas detector before being brought into the garage (CFC2903.4.2).
	LNG is generally stored above ground. Since it is a cryogenic liquid, in the event of a release, a fraction of the liquid immediately flashes off to gas while the majority of the remainder will pool and boil violently emitting dense vapor. If a source of ignition is present, the boiling liquid, dense vapor and gas could explode and burn threatening surrounding facilities and other storage vessels.	Tanks can be protected by containment dikes (required if neighboring tanks can be affected LAFC57.42.11) and physically separated LAFC57.42.10) so that they do not interact in case of a fire or explosion. Deluge systems can be installed to cool neighboring tanks in case of a fire.
Biodiesel	Certain materials used in conventional petroleum storage are not compatible with pure biodiesel.	Use biodiesel compatible plastic and rubber for fittings.

TABLE 4.3-5 (Concluded)

Summary of Hazards and Existing Safety Regulations/Procedures Associated with Alternative Clean-Fuels

FUEL TYPE	HAZARD	REGULATION/PROCEDURE
Hydrogen	Releasing gas in enclosed spaces with its related explosive hazards may pose an explosive hazard. (A flammable concentration within an enclosed space in the presence of an ignition source can explode.)	Installation of combustible gas detection systems can provide early detection of leaks. Ignition sources can be reduced/eliminated by ensuring that all electrical systems in the shop are explosion proof. Providing adequate ventilation can prevent the occurrence of explosive conditions. Procedures can be established to ensure that all vehicles are defueled prior to maintenance.
EV and Hybrid Vehicles	Certain types of batteries that are used in commercially available electric vehicles emit hydrogen during the charging process. Emission of hydrogen gas in an enclosed setting such as a garage presents the potential for the accumulation of flammable concentrations.	Forced ventilation can prevent build-up but if ventilation fails, a hazardous condition can occur. NEC and SAE recommended practices provide strict guidance for eliminating hydrogen gas risk.
	Li-ion batteries that are used in some commercially available electric vehicles can combust spontaneously.	Reinforced casing and battery cooling systems can prevent the combustion of Li-ion batteries. FMVSS 305 and SAE recommendations provide guidance for eliminating combustion risk.

FMVSS = Federal Motor Vehicle Safety Standard
NEC = National Electric Code
SAE = Society of Automotive Engineers

The use of alternative fuels requires additional knowledge and training of emergency responders and owners/operators of fueling stations regarding maintaining and operating alternative fuel refueling stations. Further, as use of alternative fuels increases in the Basin, use of conventional fuels such as gasoline and diesel will decline. As a result, explosion and flammability hazards associated with conventional fuels will also decline. In addition, hazards and hazardous clean-up associated with accidental releases of conventional fuels, especially diesel, are reduced with increasing use of alternative fuels.

When users of alternative fuels comply with existing regulations and recommended safety procedures, hazards impacts associated with the use of alternative fuels are expected to be the same or less than those of conventional fuels. Accordingly, hazards impacts from the increased use of alternative fuels are expected to be similar to or less than hazards associated with conventional fuels. Lastly, the hazard impacts associated with using batteries in electric/hybrid vehicles were concluded to be less than significant. Because no significant hazard impacts were identified that pertain to using batteries in electric/hybrid vehicles, no mitigation measures are required.

4.3.4.3 Ammonia Use in SCRs, SNCRs, and Dry Gas Scrubbers

Implementation of some control measures in the 2016 AQMP could result in the use of SCR or SNCR technology to reduce NOx emissions including CMB-05, BCM-05, ORFIS-01, and ORFIS-03. In addition, a greater use of SCRs, SNCRs, and dry gas scrubber (DGS) may occur on industrial combustion sources such as boilers and heaters, as well as large diesel engines on mobile sources to reduce NOx, including off-road diesel engines (e.g., locomotive engines and marine vessel engines).

SCR is post-combustion control equipment for NOx control of existing combustion sources like boilers, steam generators, and process heaters that is capable of reducing NOx emissions by as much as 90 percent or higher. A typical SCR system design can consist of an ammonia storage tank, ammonia vaporization and injection equipment, an SCR reactor with catalyst, ancillary electronic instrumentation, and operations control equipment. In some situations, an SCR system may also utilize a booster fan for the flue gas exhaust and an exhaust stack. The way an SCR system reduces NOx is through a matrix of nozzles injecting a mixture of ammonia and air directly into the flue gas exhaust stream from the combustion equipment. As this mixture flows into the SCR reactor that is replete with catalyst, ammonia, and oxygen (from the air), the flue gas exhaust reacts primarily (i.e., selectively) with NO and NO_2 to form nitrogen and water in the presence of a catalyst. The amount of ammonia introduced into the SCR system is approximately a 1.0-to-1.05 molar ratio of ammonia to NOx for optimum control efficiency, though the ratio may vary based on equipment-specific NOx reduction requirements. The ammonia injection rate is also regulated by the fuel flow rate to the unit.

SNCR is another post-combustion control technique typically used to reduce the quantity of NOx produced in the hot flue gas, by injecting ammonia. The main differences between SNCR and SCR is that the SNCR reaction between ammonia and NOx in the hot flue gas occurs without the need for a catalyst, but at much higher temperatures (i.e., between 1200 °F to 2000 °F). With a control efficiency ranging between 80 and 85 percent, SNCR does not achieve as great of NOx emission reductions as SCR. The need for the exhaust temperature to be high also limits the applicability of SNCR. SNCR would not be considered equivalent to BARCT alone, but it could be used if combined with other technologies.

DGS use a ceramic catalyst filter with ammonia injection at temperatures ranging from 350 °F to 750 °F. The filter removes particulate matter and, with the addition of calcium hydroxide (commonly referred to as, hydrated or slaked lime) or sodium bicarbonate (commonly referred to as baking soda), can also reduce SOx.

In SCR, SNCR, and DGS technology, ammonia or urea is used to react with the NOx, either in the presence of a catalyst or without a catalyst, respectively, to form nitrogen gas and water. Ammonia is the primary hazardous chemical identified with the use of air pollution control equipment (e.g., SCR and SNCR systems). Ammonia, though not a carcinogen, can have chronic and acute health impacts. Therefore, a potential increase in the use of ammonia may increase the current existing risk setting associated with deliveries (i.e., truck and road accidents) and onsite or offsite spills for each facility that currently uses or will begin to use ammonia. Exposure to a toxic gas cloud is the potential hazard associated with this type of control equipment. A toxic gas cloud is the release of a volatile chemical such as anhydrous ammonia that could form a cloud that migrates off-site, thus exposing individuals. Anhydrous ammonia is heavier than air such that when released into the atmosphere, would form a cloud at ground level rather than be dispersed. "Worst-case" conditions tend to arise when very low wind speeds coincide with the accidental release, which can allow the chemicals to accumulate rather than disperse. Though there are facilities that may be affected by the proposed 2016 AQMP control measures that are currently permitted to use anhydrous ammonia, for new construction, however, current SCAQMD policy requires the use of aqueous ammonia, unless a hazard analysis shows that the impacts of the anhydrous ammonia tank would remain on-site and would be less than significant. To minimize the hazards associated with ammonia used in the SCR, SNCR, or DGS process, aqueous ammonia (100 percent anhydrous ammonia diluted with water to 19 percent by volume) is typically required as a permit condition associated with the installation of SCR, SNCR, or DGS equipment for the following reasons: 1) 19 percent aqueous ammonia does not travel as a dense gas like anhydrous ammonia; and, 2) 19 percent aqueous ammonia is not on any acutely hazardous material lists unlike anhydrous ammonia or aqueous ammonia at higher percentages. As such, aqueous ammonia is expected to be used, unless the applicant demonstrates that the use of anhydrous ammonia can be mitigated to less than significant. As a result, this analysis focuses on the use of 19 percent by volume aqueous ammonia. Thus, because aqueous ammonia (at 19 percent by weight) would be required for any permits issued for the installation of air pollution control equipment that utilize ammonia, no new hazards from toxic clouds are expected to be associated with the proposed project. For these safety reasons, aqueous ammonia is recommended for use in these technologies.

In addition, safety hazards related to the transport, storage and handling of ammonia exist (discussed later in Section 4.3.4.7). Ammonia has acute and chronic non-cancer health effects and also contributes to the formation of ambient PM10 and PM2.5 emissions under some circumstances. Since ammonia is not typically considered to be a flammable compound, other types of hazard impacts such as fires and explosions are not expected to occur and, therefore, will not be evaluated as part of this hazards analysis. To further evaluate the potential for significant adverse environmental impacts due to an accidental release of ammonia, various scenarios were evaluated that could occur during the onsite storage, transportation, and transfer of ammonia. These scenarios and their consequences are discussed in detail below.

A spill of any of the hazardous materials (including ammonia) used and stored at any of the affected facilities could occur under upset conditions such as an earthquake, tank rupture, or tank overflow. Spills could also occur from corrosion of containers, piping and process equipment, and leaks from seals or gaskets at pumps and flanges. A major earthquake would be a potential cause of a large spill. Other causes could include human or mechanical error. Construction of the vessels and foundations in accordance with the California Building Code requirements helps structures to resist major earthquakes without collapse, but may result in some structural and non-structural damage following a major earthquake. As required by U.S. EPA's spill prevention control and countermeasure regulations, all of the affected facilities are currently required to have emergency spill containment equipment and would implement spill control measures in the event of an earthquake. Storage tanks typically have secondary containment such as a berm, which would be capable of containing 110 percent of the contents of the storage tanks. Therefore, should a rupture occur, the contents of the tank would be collected within the containment system and pumped to an appropriate storage tank.

Spills at affected industrial or commercial facilities would be collected within containment structures. Large spills outside of containment areas at affected facilities that could occur when transferring the material from a transport truck to a storage tank are expected to be captured by the process water system where they could be collected and controlled. Spilled material would be collected on-site and pumped to an appropriate tank or sent off-site if the materials cannot be used on-site.

The impacts associated with an on-site ammonia tank rupture were evaluated extensively in SCAQMD's December 2015 Final Program Environmental Assessment (PEA) prepared for the Proposed Amended Regulation XX – Regional Air Incentives Market (RECLAIM) (SCAQMD, 2015). The ammonia tank rupture release scenarios evaluated in the December 2015 Final PEA are also included in this Program EIR.

Ammonia Tank Rupture Scenario 1 (Non-Refinery Sector):
Based on engineering estimates and discussion with control technology vendors, it was estimated that the largest aqueous ammonia tank that would be installed at a non-refinery facility would be 5,000 gallons. All ammonia tanks are required to be installed within berms that hold 110 percent of the contents of the tank. U.S. EPA's RMP*Comp was used to estimate the zone of impact from a worst-case release. Although it is SCAQMD policy to reduce potential hazards associated with ammonia by requiring a permit condition that limits the aqueous ammonia concentration to 19 percent, the U.S. EPA model only has the capability of evaluating the hazard potential of 20 percent aqueous ammonia. Therefore, the potential adverse impacts from aqueous ammonia were evaluated based on the 20 percent aqueous ammonia. Further, since it is assumed that an aqueous ammonia tank servicing one or more SCR systems would need to be relatively near to the existing equipment, the toxic endpoint for aqueous ammonia from a worst-case failure of a storage tank that would significantly adversely affect the sensitive receptors surrounding the existing equipment was analyzed.

Because a hazard analysis is dependent on knowing the exact location of the hazard within the site (e.g., location of the ammonia storage tank(s)), meteorological conditions, location of the receptor, etc., a site-specific hazard analysis is difficult to conduct without this information. Since SCAQMD staff does not currently know the exact location of ammonia storage tanks that would be installed in the future, to estimate a worst-case analysis, the RMP*Comp worst-case assumptions were used:

Location of tanks: Stand-alone tanks not within a building

Quantity Released: 5,500 gallons of aqueous ammonia will be spilled into a berm (the total of one 5,000 gallon tanks plus 10 percent to account for a rupture during filling)

Liquid Temperature at the time of the spill: 77 ºF

Mitigation Measures: Release into an open berm, in direct contact with outside air

Topography: Urban surroundings with many obstacles in the immediate area

Toxic Endpoint: 0.14 milligrams per liter (basis: ERPG-2)

Wind Speed: 1.5 meters per second (3.4 miles per hour)

Air Temperature: 77 ºF

The estimated distance to the toxic endpoint from the facility is 0.1 miles or 528 feet. SCR and systems are expected to be used at major industrial facilities and locations. These facilities are often large enough and have sufficient space to site new storage tanks more than 528 feet away from sensitive receptors, minimizing the potential impacts associated with new tanks. However, information on specific projects potentially affected by these control measures are unknown at this time. As such, to identify any impacts at this time without knowing the specific design features would be speculative. Nonetheless, there are a number of locations throughout the Basin where sensitive receptors are located within 528 feet of industrial facilities.

Ammonia Tank Rupture Scenario 2 (Refinery Sector):

Based on engineering estimates and discussion with control technology vendors, it was estimated that the largest aqueous ammonia tank that would be installed at a refinery facility would be 11,000 gallons. Although it is SCAQMD policy to reduce potential hazards associated with ammonia by requiring a permit condition that limits the aqueous ammonia concentration to 19 percent, the U.S. EPA model only has the capability of evaluating the hazard potential of 20 percent aqueous ammonia. Therefore, the potential adverse impacts from aqueous ammonia were evaluated based on the 20 percent aqueous ammonia. Further, since it is assumed that an aqueous ammonia tank servicing one or more SCR systems would need to be relatively near to the existing equipment, the toxic endpoint for aqueous ammonia from a worst-case failure of a storage tank that would significantly adversely affect the sensitive receptors surrounding the existing equipment was analyzed.

Because a hazard analysis is dependent on knowing the exact location of the hazard within the site (e.g., location of the ammonia storage tank(s)), meteorological conditions, location of the receptor, etc., a site-specific hazard analysis is difficult to conduct without this information. Since SCAQMD staff does not currently know the exact location of ammonia storage tanks that would be installed in the future, to estimate a worst-case analysis, the RMP*Comp worst-case assumptions were used:

Location of tanks: Stand-alone tanks not within a building

Quantity Released: 12,100 gallons of aqueous ammonia will be spilled into a berm (the total of one 11,000 gallon tanks plus 10 percent to account for a rupture during filling)

Release Rate: 11.7 pounds per minute

Liquid Temperature at the time of the spill: 77 degrees ^{o}F

Mitigation Measures: Release into an open berm, in direct contact with outside air

Topography: Urban surroundings with many obstacles in the immediate area

Toxic Endpoint: 0.14 milligrams per liter (basis: ERPG-2)

Wind Speed: 1.5 meters per second (3.4 miles per hour)

Air Temperature: 77 ^{o}F

The estimated distance to the toxic endpoint from any refinery facility is 0.1 miles or 528 feet. Refineries in the Basin are large and generally consist of hundreds of acres. Nonetheless, they all have sufficient space to site new storage tanks more than 528 feet away from sensitive receptors, minimizing the potential impacts associated with new tanks. Further, the existing refineries already have ammonia storage tanks so that the need for new ammonia storage tanks is expected to be limited.

4.3.4.4 Use of Catalysts

Implementing various control measures proposed in the 2016 AQMP could result in the increased use of catalysts as well as an increase in the quantity of catalyst disposed of as hazardous materials, including in SCRs and DGSs per control measures CMB-05, BCM-05, ORFIS-01, and ORFIS-03.

There are two main types of catalysts used in SCRs: one in which the catalyst is coated onto a metal structure and the other is a ceramic-based catalyst onto which the catalyst components are calcified. Commercial catalysts used in SCRs are comprised of a base material of titanium dioxide (TiO_2) that is coated with tungsten trioxide (WO_3), molybdic anhydride (MoO_3), vanadium pentoxide (V_2O_5), or iron oxide (Fe_2O_3). SCR catalysts are typically replaced approximately once every five years. The key hazards associated with catalyst use are when the spent catalyst is crushed and transported for disposal or recycling. Recycling of catalyst means hauling the spent catalyst to a facility that either recycles or recovers the heavy metal components from the catalyst or that uses the catalyst as a ingredient for manufacturing cement. (The nearest cement plant is located outside of the Basin.)

With respect to hazards and hazardous materials, there will be an increase in the frequency of truck transportation trips to remove the spent catalyst as hazardous materials or hazardous waste from each affected facility. However, facilities that have existing catalyst-based operations currently recycle the catalysts blocks, in lieu of disposal. Moreover, due to the heavy metal content and relatively high cost of catalysts, recycling can be more lucrative than disposal. Thus, facilities that have existing SCR units and choose to employ additional SCR equipment, in most cases already recycle the spent catalyst and subsequently may continue to do so with any additional catalyst that may be needed.

Although recycling may be the more popular (and potentially lucrative) consideration, it is possible that facilities may choose to dispose of the spent catalyst in a landfill. The composition and type of the catalyst will determine the type of landfill that would be eligible to handle the disposal. For example, catalysts with a metal structure would be considered a metal waste, like copper pipes, and not a hazardous waste. Therefore, metal structure catalysts would not be a regulated waste requiring disposal in a Class I landfill, unless it is friable or brittle. As ceramic-based catalysts contain a fiber-binding material, they are not considered friable or brittle and, thus, would not be a regulated waste requiring disposal in a Class I landfill. Furthermore, typical catalyst materials are not considered to be water soluble, which also means they would not require disposal in a Class I landfill. In both cases, spent catalyst would not require disposal in a Class I landfill.

Based on the aforementioned information, it is likely that spent catalysts would be considered a "designated waste," which is characterized as a non-hazardous waste consisting of, or containing pollutants that, under ambient environmental conditions, could be released at concentrations in excess of applicable water objectives, or which could cause degradation of the waters of the state (California Code of Regulations, Title 23, Chapter 3 Subparagraph 2522(a)(1)). Depending on its actual waste designation, spent catalysts would likely be disposed of in a Class II landfill or a Class III landfill that is fitted with liners.

4.3.4.5 Use of Caustic in Wet Gas Scrubbers

Implementation of some control measures proposed in the 2016 AQMP could result in the use of wet gas scrubber (WGS) technology to reduce NOx emissions including CMB-05. Use of WGS may occur on refinery sources such as fluidized catalytic cracking units (FCCU), sulfur recovery units (SRU), and tail gas treatment units (TGU).

For any operator that chooses to install a WGS for a FCCU, hazardous materials may be needed to operate the WGSs depending on the source category and additional solid waste is expected to be generated. Caustic is a key ingredient needed for the operation of a WGS. While there are several types of caustic solutions that can be used in WGS operations, caustic made from sodium hydroxide (NaOH) is the most commonly used for WGSs for FCCUs and it is considered an acutely hazardous substance. Sodium hydroxide is in use at refineries, so on-site storage is expected to exist, but if needed a new storage tank may be constructed. However, the increased use would likely require additional deliveries of NaOH.

It is expected that the affected facilities will receive NaOH from a local supplier located in the greater Los Angeles area. Deliveries of NaOH (50 percent by weight) would be made by tanker truck via public roads as is currently the case with existing NaOH deliveries. NaOH is typically delivered in 6,000 gallon trucks, so the proposed project would not introduce any new transportation hazards for NaOH.

The onsite storage and handling of NaOH creates the possibility of an accidental spill and release of NaOH. However, because NaOH has such a low vapor pressure (6.33 mm Hg at 40 ºC or 104 ºF) when compared to water (55.3 mm Hg at 40 ºC or 104 ºF) at the same temperature, any spill of NaOH would not be expected to evaporate faster than water. Thus, any spill of NaOH would be expected to stay in liquid form and would not likely exceed the ERPG-2 vapor concentration of five milligrams per cubic meter for NaOH. Further, operators at each affected facility who construct a new NaOH storage tank will need to build a containment berm large enough to hold 110 percent of the tank capacity in the event of an accidental release due to tank rupture. Thus, any spill of NaOH would not be expected to migrate beyond the boundaries of the berm on-site. Further, any spill of NaOH is not expected to present a potential offsite public and sensitive receptor exposure. Lastly, since NaOH is not a flammable compound, other types of heat-related hazard impacts such as fires, explosions, or BLEVE are not expected to occur and, therefore, will not be evaluated as part of this hazards analysis. In conclusion, the hazards and hazardous materials impacts due to the use, tank rupture, and the accidental release of NaOH will be less than significant for the proposed project.

For WGSs that may be installed to control NOx from SRU/TGUs, the caustic used in the WGS is made from soda ash, instead of NaOH. Soda ash is the common name for sodium carbonate (Na2CO3), a non-toxic, non-cancerous, and non-hazardous substance. Soda ash has a NFPA health rating 2 because it corrosive and may be harmful if inhaled and may cause skin irritation and workers handling soda ash will need to take the necessary precautions as required by OSHA when dealing with this substance which include the use of protective clothing including goggles, rubber gloves and coveralls.

4.3.4.6 Use of Acidifiers

Control Measure BCM-04 would control ammonia emissions from livestock operations through the application of the acidifier sodium bisulfate (SBS). SBS has been used to reduce pH levels in dairy bedding (e.g., hay or straw) and manure, which in turn reduces bacterial and ammonia levels. In California, SBS has also been used by dairies in Tulare, Fresno, Merced, Stanislaus, San Joaquin, Kings, Kern, San Bernardino, Riverside, San Benito and Sacramento counties, to prevent cow lameness and nuisance flies.

While SBS is considered an irritant because of its low pH, it is safe for use in water treatment. In particular, SBS has been used as a disinfectant to prevent damage of the membrane used in reverse osmosis during water treatment. SBS is certified for treating drinking water (e.g., for chlorine removal, corrosion and scale control, and pH adjustment). SBS is used to lower the pH of water for effective chlorination, including water in swimming pools. SBS is also approved as a general use feed additive, including companion animal food.

SBS is considered Generally Recognized as Safe (GRAS) by the Food and Drug Administration (FDA) and meets their definition of a natural product (FDA, 1998). The FDA has approved of SBS as a food additive and food grade SBS is used in a variety of food products, including beverages, dressings, sauces, cake mixes, and fillings. It is also widely used in meat and poultry processing and in browning prevention of fresh cut produce.

Because SBS is a salt, the transportation and flammability risks of SBS are very low. In a worst case-scenario if a spill was to occur, the hazards impacts would be negligible.

4.3.4.7 Transport Hazards

4.3.4.7.1 LNG

LNG is non-toxic, disperses more readily in air than conventional fuels, and has more rigorous standards for transportation. It is expected that affected facilities will receive LNG from a local supplier located in the Basin. Deliveries of LNG would be made to the other affected facilities by tanker truck via public roads. The transport of LNG is regulated by the U.S. DOT. LNG trucks are double-walled aluminum and are designed to withstand accidents during the transport of LNG. LNG is loaded into delivery tanks at atmospheric pressure, which would be at its boiling point of -260ºF (-162ºC). The LNG is maintained at this temperature by evaporation of the boiling LNG and venting of the evaporated LNG. Because the vent is closed during shipment, the pressure in the tank builds and the temperature of the LNG increases. The FMCSA analyzed releases from delivery tanks with an average pressure of 30 psig, which would be -230ºF (-146ºC). At 30 psig, approximately 30 percent of the LNG will flash into vapor when released.

Transportation Release Scenarios: These LNG transport release scenarios were analyzed in the December 2007 Final EA for Proposed Amended Rule 1110.2 – Emissions from Gaseous- and Liquid-Fueled Internal Combustion Engines (ICEs) (SCAQMD No. 280307JK). The following description of LNG transportation and consequences is taken from the Federal Motor Carrier Safety Administration (FMCSA)[6].

Four scenarios were identified as having major consequences:

1. Release of LNG into a pool that evaporates and disperses without ignition. Approximately 40 percent of the liquefied LNG immediately flashes into vapor. The temperature of the liquid pool would be -44 ºF (-42ºC) and would therefore damage exposed vegetation and people.

2. A flammable cloud is formed that contacts an ignition source. The flame front can flash back and set the liquid pool on fire. Quantities of LNG shipped by truck would not typically cause vapor cloud explosions.

3. A BLEVE occurs. BLEVEs would occur when an LNG tank is exposed to fire and the increase in pressure within the tank exceeds the capacity of the relief valve.

4. The tank ruptures, rockets away, and ignites.

RMP*Comp was used for the consequence analysis for these four scenarios. The adverse impacts from the four scenarios were determined to be:

1. The area of the pool was estimated by assuming a depth of one centimeter as described in Example 29 in the U.S. EPA's Risk Management Program Guidance for Offsite Consequence Analysis.[7] A 6,000 gallon LNG pool would be 24,448 square feet. This distance would be a "worst-case" since as the LNG pool expands from the tank it will warm and evaporate.

2. A pool fire of 6,000 gallons that is released in one minute would result in a heat radiation endpoint (five kilowatts/square meter) of 0.2 mile. If a vapor cloud fire occurs, the estimated distance to the lower flammability limit would be 0.3 mile.

3. Based on 10,000 gallons the BLEVE would result in a fireball that may cause second-degree burns out to 0.3 mile.

4. The "worst-case" release estimate for 10,000 gallons in RMP*Comp is 0.3 mile from the vapor cloud explosion. Since, it is unclear as to how far away the tank would travel, it was assumed that the adverse impact would be 0.3 mile from where the tank lands. Damage to property and persons may occur from physical impact from the rocketing tank.

[6] Federal Motor Carrier Safety Administration, Comparative Risks of Hazardous Materials and Non-Hazardous Materials Truck Shipment Accidents/Incidents, Final Report, March 2001, www.fmcsa.dot.gov/documents/hazmatriskfinalreport.pdf.

[7] U.S. EPA, Risk Management Program Guidance for Offsite Consequence Analysis, EPA 550-B-99-009, April 1989.

During transportation of LNG, it was estimated that the adverse impacts from various releases would extend 0.3 mile. Because sensitive receptors may be within the endpoint distances above, the accidental release of LNG during transport could cause significant adverse hazards.

Based upon the preceding information, increased transport of LNG may substantially alter existing transportation hazards associated with mobile source fuels. Consequently, increased usage of LNG is expected to generate significant adverse hazard impacts during transport.

4.3.4.7.2 Alternative Fuels

As shown in Table 4.3-6, the energy content of alternative fuels is lower than conventional fuels which means that more fuel is needed in an alternative fuel-powered vehicle to achieve the same range as a conventional fuel-powered vehicle. Thus, more tanker deliveries to supply refueling stations would be required to provide the same available energy as conventional fuels. Since the probability of accidents is related to the amount of miles traveled, proportionally more delivery accidents can be expected with alternative fuels than conventional fuels (assuming that they are delivered from similar source locations in similar sized tankers). However, the truck accident rate is small, on the order of one accident per five million miles traveled and the accident rate with chemical releases is even less (U.S. DOT, 2014). Furthermore, any increase in alternative fuels use would decrease the use of conventional fuels and replace those miles traveled, so hazards associated with transportation and storage of all of the alternative fuels would not be a significant risk factor.

TABLE 4.3-6

Equivalent Fleet Miles
Associated with Alternative Clean-Fuels

FUEL TYPE	BY MASS	BY VOLUME
Diesel	1.00	1.0
CNG/LNG	1.15	1.9
LPG	1.15	2.1
Ethanol	1.90	2.3

Source: Clean Air Program: Summary of Assessment of the Safety, Health, Environmental and System Risks of Alternative Fuels. (DOT, 1999)

4.3.4.7.3 Ammonia

It is expected that affected facilities will receive ammonia from a local ammonia supplier located in the greater Los Angeles area. Deliveries of aqueous ammonia would be made to the other affected facilities by tanker truck via public roads. The maximum capacity of an ammonia tanker truck is approximately 7,000 gallons.

Ammonia Transportation Release Scenario:

The impacts associated with an accident involving aqueous ammonia were evaluated extensively in the SCAQMD's December 2015 Final PEA for the Proposed Amended Regulation XX –

Regional Air Incentives Market (RECLAIM) (SCAQMD, 2015). The ammonia transportation release scenarios evaluated in the December 2015 Final PEA are included in this Program EIR.

To analyze the effects of aqueous ammonia as a result of an accidental release due to tank rupture, a Consequence Analysis using the U.S. EPA RMP*Comp (Version 1.07) is typically performed. Aqueous ammonia trucks have a capacity of 7,000 gallons. U.S. EPA's RMP*Comp was used to estimate the zone of impact from a worst-case release. Although it is SCAQMD policy to reduce potential hazards associated with ammonia by requiring a permit condition that limits the aqueous ammonia concentration to 19 percent, the U.S. EPA model only has the capability of evaluating the hazard potential of 20 percent aqueous ammonia. Therefore, the potential adverse impacts from aqueous ammonia were evaluated based on 20 percent aqueous ammonia. Based on the worst-case defaults, the toxic endpoint from a delivery truck would be 0.4 miles.

Because a hazard analysis is dependent on knowing the exact location of the spill (e.g., meteorological conditions, location of the receptor, etc., a site-specific hazard analysis is difficult to conduct without this information. Since SCAQMD staff does not currently know the exact location of ammonia storage tanks that would be installed in the future, to estimate a worst-case analysis, the RMP*COMP worst-case assumptions were used:

Location of tank~~s~~: Stand-alone tanks (i.e., not within a building)

Quantity Released: 7,000 gallons of aqueous ammonia

Liquid Temperature at the time of the spill: 77 °F

Mitigation Measures: None

Topography: Urban surroundings with many obstacles in the immediate area

Toxic Endpoint: 0.14 milligrams per liter (basis: ERPG-2)

Wind Speed: 1.5 meters per second (3.4 miles per hour)

Air Temperature: 77 °F

The estimated distance to the toxic endpoint from a worst-case delivery truck release is 0.4 miles or 2,112 feet. Since sensitive receptors are expected to be found within 0.4 miles from roadways, the hazards and hazardous materials impacts due to a delivery truck accident will be potentially significant. Therefore, the proposed project has the potential to generate significant adverse hazard impacts during transportation as a result of the potential for accidental releases of delivered aqueous ammonia.

4.3.4.8 Sites Included on a List of Hazardous Materials Sites

The DTSC maintains a database of hazardous materials sites called EnviroStor, which replaced the CalSites database. EnviroStor contains: 1) information on properties located throughout California where hazardous substances were released; 2) identifies formerly contaminated properties which have been released for re-use; 3) identifies properties with environmental deed restrictions to prevent inappropriate land use development; and, 4) risk characterization information used to assess potential public health impacts and impacts to the environment. There are various federal, state, and local laws such as Government Code §65962.5; Occupational Safety and Health Code 197; the Response Conservation, and Recovery Act; the Comprehensive Environmental Response, Compensation, and Liability Act; the Hazardous Materials Release and Clean-Up Act; the Uniform Building Code; and county and city building standards. Furthermore, SCAQMD Rule 1166 – Volatile Organic Compound Emissions from Decontamination of Soil, regulates the emissions of VOCs from contaminated soils. SCAMQD Rule 1403 – Asbestos Emissions from Demolition/Renovation Activities, regulates the presence of asbestos during construction. Finally, the 2016 AQMP contains TXM-04, which seeks to develop control measures that would control the toxic metal particulates generated during soil cleanup or remediation activities at these sites. The 2016 AQMP would be applicable to all facilities located within the Basin, of which some facilities are included on lists of hazardous materials sites (or are located adjacent to listed facilities) compiled pursuant to Government Code §65962.5. Thus, near-surface contaminated soil may be encountered during demolition and/or construction activities associated with implementation of the 2016 AQMP. Depending on the location of the nearest sensitive receptor(s), it is possible that construction activities would create a significant hazard to the public or environment. Furthermore, without knowing the types of contamination (i.e., VOCs, TACs, etc.) it is not possible to know in advance which regulations would apply.

4.3.5 MITIGATION MEASURES

Based on the impact analysis listed above, the routine use of alternative fuels such as ethanol, CNG, LNG, LPG, biodiesel, renewable diesel, and hydrogen will not create a significant hazard to the public and the impact is less than significant. The routine use of caustic, catalysts, and acidifiers will not create a significant hazard to the public and the impact is less than significant. The use of batteries in electric/hybrid vehicles were found to be less than significant. Spills are not expected to migrate from any affected facility due to the requirements for and design of containment systems; therefore, the impacts from spills are considered to be less than significant. The transportation of alternative fuels, except LNG, will not create a significant hazard to the public and the impact is less than significant. The transportation of LNG fuel is concluded to create a significant hazards and hazardous material impact from exposure to the one psi overpressure from the cataclysmic destruction of the LNG storage tank. However, there are no feasible mitigation measures to reduce this significant impact.

Since hazards and hazardous materials impacts associated with increased flammability of potential replacement solvents, reformulated coatings, adhesives, and sealants were found to be significant, the following mitigation measures are required:

HZ-1 Add consumer warning requirements for all reformulated products that are flammable and extremely flammable.

HZ-2 Add requirements to conduct a public education and outreach program in joint cooperation with local fire departments regarding reformulated products that are flammable and extremely flammable, especially for reformulated consumer paint thinners and multi-purpose solvents.

Although the impacts evaluated in the accidental release scenarios for aqueous ammonia and tank rupture in the refinery sector were concluded to be less than significant, the impacts due to tank rupture in the non-refinery sector were found to be significant. Mitigation measures are required, if feasible, to minimize the potentially significant "worst-case" hazard impacts. As discussed in Section 3.4.2, there are a number of rules, regulations, and laws governing storage tanks that will minimize the potential adverse impacts associated with hazards at a facility and which would minimize the hazards associated with ammonia storage tanks. Under federal OSHA, regulations have been promulgated that require the preparation and implementation of a PSM Program (40 CFR Part 1910, Section 119, and Title 8, CCR, Section 5189). A PSM that meets the requirements of the regulations will minimize the consequences of a release involving a toxic, reactive, flammable, or explosive chemical. Ultimately, mitigation measures would need to be identified on a project-by-project basis and would be the responsibility of the lead and responsible agencies based on their underlying legal authority to require mitigation.

Potentially significant impacts on hazards impacts associated with the storage and transportation of LNG as an alternative fuel are anticipated, so mitigation measures are required. The following mitigation measures are recommended to be implemented in accordance with design measures that are typically required by local fire departments:

HZ-3 Install secondary containment (e.g., berms).

HZ-4 Install valves that fail shut.

HZ-5 Install emergency release valves and barriers around LNG storage tanks to prevent the physical damage to storage tanks or limit the release of LNG from storage tanks.

HZ-6 Perform integrity testing of LNG storage tanks to assist in preventing failure from structural problems. Construct a containment system to be used for deliveries during off-loading operations.

The transportation release scenario for ammonia has potentially significant adverse hazards and hazardous materials impacts. Therefore, mitigation is required. However, no feasible mitigation measures have been identified, over and above the extensive safety regulations that currently apply to delivery trucks that transport ammonia.

The 2016 AQMP would affect facilities and sites which might be identified on lists pursuant to Government Code §65962.5 and in the event that construction occurs at any of those sites, a significant hazard to the public or environment could be created. Furthermore, schools could be located within a quarter mile of facilities that are identified on the aforementioned lists, creating a significant hazard for the students and teachers. In addition to compliance with existing federal, state, and local regulations, the following mitigation measures are proposed to reduce impacts at facilities that are identified on the aforementioned lists:

HZ-7 Conduct a Phase I Environmental Site Assessment prior to construction. If known contamination is discovered, a Phase II environmental Site Assessment should be conducted and provided to the Lead Agency. The recommendations in the Environmental Site Assessments should be implemented.

HZ-8 Consult with the appropriate local, state, and federal environmental regulatory agencies to ensure sufficient minimization of risk to human health and environmental resources, both during and after construction, posed by soil contamination, groundwater contamination, or other surface hazards including, but not limited to, underground storage tanks, fuel distribution lines, waste pits and sumps.

HZ-9 Cease work if soil, groundwater, or other environmental medium with suspected contamination is encountered unexpectedly during construction activities (e.g., identified by odor or visual staining, or if any underground storage tanks, abandoned drums, or other hazardous materials or wastes are encountered), in the vicinity of the suspect material. Secure the area as necessary and take all appropriate measures to protect human health and the environment, including but not limited to: notification of regulatory agencies and identification of the nature and extent of contamination. Stop work in the areas affected until the measures have been implemented consistent with the guidance of the appropriate regulatory oversight authority.

HZ-10 Use best management practices (BMPs) regarding potential soil and groundwater hazards.

HZ-11 Soil generated by construction activities should be stockpiled on-site in a secure and safe manner. All contaminated soils determined to be hazardous or non-hazardous waste must be adequately profiled (sampled) prior to acceptable reuse or disposal at an appropriate off-site facility. Complete sampling and handling and transport procedures for reuse or disposal, in accordance with applicable local, state and federal laws and policies.

HZ-12 Groundwater pumped from the subsurface should be contained on-site in a secure and safe manner, prior to treatment and disposal, to ensure environmental and health issues are resolved pursuant to applicable laws and policies. Utilize engineering controls, which include impermeable barriers to prohibit groundwater and vapor intrusion into the building.

HZ-13 Prior to issuance of any demolition, grading, or building permit, submit for review and approval by the Lead Agency (or other appropriate government agency) written verification that the appropriate federal, state and/or local oversight authorities, including but not limited to the Regional Water Quality Control Board (RWQCB), have granted all required clearances and confirmed that the all applicable standards, regulations, and conditions have been met for previous contamination at the site.

HZ-14 Develop, train, and implement appropriate worker awareness and protective measures to assure that worker and public exposure is minimized to an acceptable level and to prevent any further environmental contamination as a result of construction.

HZ-15 Where a project site is determined to contain materials classified as hazardous waste by state or federal law, submit written confirmation to appropriate local agency that all state and federal laws and regulations will be followed when profiling, handling, treating, transporting, and/or disposing of such materials.

HZ-16 The temporary storage and handling of potentially hazardous materials/wastes should be in areas away from sensitive receptors such as schools or residential areas. These areas should be secured with chain-link fencing or similar barrier with controlled access to restrict casual contact from non-project personnel. All project personnel that may come into contact with potentially hazardous materials/wastes will have the appropriate health and safety training commensurate with the anticipated level of exposure.

HZ-17 Where the construction or operation of projects involves the transport of hazardous materials, avoid transport of such materials within one-quarter mile of schools, when school is in session, wherever feasible.

HZ-18 Where it is not feasible to avoid transport of hazardous materials, within one-quarter mile of schools on local streets, provide notification of the anticipated schedule of transport of such materials.

4.3.6 IMPACTS AFTER MITIGATION

The SCAQMD cannot predict which coatings, solvents, adhesives, and sealants each affected facility might choose to use in the future as reformulated products become available or estimate the amount of coatings to be used. Mitigation measures were crafted to inform consumers about any potential fire hazards that may be associated with those reformulated products that may have increased flammability. While the promotion of consumer awareness may be helpful for safety reasons, these mitigation measures do not physically reduce any fire hazards in the reformulated products themselves. Thus, after implementation of mitigation measures HZ-1 and HZ-2, the fire hazards impacts are expected to remain significant.

The impacts from tank rupture of LNG and ammonia (in the non-refinery sector), and transport of LNG and ammonia are expected to remain significant even after implementation of mitigation measures HZ-3 to HZ-6.

In addition to the federal, state, and local regulations that facilities and sites listed on lists pursuant to Government Code §65962.5 must comply with, implementation of mitigation measures HZ-7 to HZ-15 will reduce the impacts to less than significant.

Implementation of the 2016 AQMP is expected to result in an overall reduction in toxic emissions due to the toxic control measures. Nevertheless, hazard impact associated with implementation of the 2016 AQMP control measures could result in potentially significant hazard impacts at sensitive receptors, including existing and proposed school sites. The location of the facilities that may use hazardous materials as a result of the 2016 AQMP control measures is currently unknown. While mitigation measures HZ-16 through HZ-18 would reduce the potentially significant hazard impacts and additional mitigation measures may be available on a site-specific basis (e.g., containment facilities, appropriate placement of tanks, etc.), the potential hazard impacts associated with the handling of hazardous or acutely hazardous materials within one-quarter mile of an existing or proposed school site remain significant.

4.4 HYDROLOGY AND WATER QUALITY

4.4.1 INTRODUCTION

This subchapter examines hydrology and water quality impacts associated with implementing the proposed control measures in the 2016 AQMP. All control measures in the 2016 AQMP were evaluated to determine whether or not they could generate direct or indirect hydrology and water quality impacts based on the anticipated methods of control.

The NOP/IS for the 2016 AQMP identified the following potentially significant hydrology and water quality impacts that may occur: 1) potential increase in water demand; 2) potential increase in wastewater discharge and related water quality impacts; 3) water quality impacts associated with increased use of alternative fuels; 4) water quality impacts associated with the accidental release of ammonia from operation of selective catalytic reduction (SCR) or selective non-catalytic reduction (SNCR) air pollution control technology; 5) water quality impacts associated with accidental releases from battery disposal and processing including acid spills; and, 6) wastewater discharge from the use of reformulated products.

4.4.2 2016 AQMP CONTROL MEASURES WITH POTENTIAL HYDROLOGY AND WATER QUALITY IMPACTS

The hydrology and water quality analysis in this Program EIR identifies the potential hydrology and water quality impacts from implementing the 2016 AQMP. All control measures were analyzed to identify the potential hydrology and water quality impacts. The NOP/IS determined that the proposed project could result in potentially significant hydrology (as water demand) water quality impacts.

The 2016 AQMP strategy is to further the penetration of partial-zero and zero emission technologies. Implementing some of the 2016 AQMP control measures could increase water demand in the region or impact water quality. Each control measure proposed in the 2016 AQMP was evaluated and 44 control measures were identified as having potential adverse hydrology and water quality impacts. Table 4.4-1 contains a summary of the 2016 AQMP control measures which may result in the use of compliance options that could generate significant hydrology and water quality impacts.

TABLE 4.4-1

Control Measures with Potential Hydrology and Water Quality Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WATER IMPACTS
ECC-03	Additional Enhancement in Reducing Existing Residential Building Energy Use (NOx, VOC)	Measure consists of incentives and promoting existing energy efficiency programs that would reduce criteria and GHG emissions.	Potential increase in water use associated with cleaning solar panels during routine maintenance.
ECC-04	Reduced Ozone Formation and Emission Reductions from Cool Roof Technology	Take credit for NOx, CO, PM, CO2, and ozone emissions reductions which would occur due to compliance with required energy efficiency mandates and state regulations.	Potential increase in water use associated with cleaning cool roofs during routine maintenance.
CMB-05	Further NOx Reductions from RECLAIM Assessment (NOx)	Re-examination of the RECLAIM program, including voluntary opt-out and the implementation of additional control equipment and SCR equipment	Potential increase in water use and wastewater discharge associated with new air pollution control equipment.
CTS-01	Further Emission Reductions from Coatings, Solvents, Adhesives, and Sealants (VOC)	Reformulation of coatings using different solvents, adhesives, and sealants.	Potential increase in water use if coatings are reformulated with water and water is used for clean-up; potential impacts to water quality due to disposal of clean-up water.
FLX-02	Stationary Source VOC Incentives (VOC)	Use of replacement coatings, such as UV cured resins and coatings, super-compliant/ultra-low emission technologies and electrification in the place of combustion based equipment.	Potential increases in water use if coatings are reformulated with water and water is used for clean-up; potential impacts to water quality due to disposal of clean-up water and products reformulated with exempt or non-exempt solvents.
BCM-01	Further Emissions Reductions from Commercial Cooking (PM)	Installation of control equipment such as ESPs, filters, centrifugal separators, and misters.	Potential increases in water use to operate wet ESPs and misters.
BCM-03	Further Emission Reductions from Paved Road Dust Sources	Reduction of track out from stationary sources by specifying street sweeping methods and frequency.	Potential increase in water use associated with wheel washing systems for dust suppression.
BCM-04	Emission Reductions from Manure Management Strategies (NH3)	Acidifier application, manure removal, manure slurry injection, and dietary manipulation and feed additives to reduce ammonia in manure	Potential increase in water use associated with the acidifier application process and slurry injections.

TABLE 4.4-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WATER IMPACTS
BCM-07	Emission Reductions from Stone Grinding, Cutting, and Polishing Operations (PM)	Installation of engineering controls, such as exhaust ventilation with dust collectors, the use of wet methods like wet-wiping or wet sweeping, and vacuuming with a HEPA filter.	Potential increase in water use from applying wet methods to prevent dust.
BCM-10	Emission Reductions from Greenwaste Composting (NH3, VOC)	Use of control such as anaerobic digestion and organic processing technology and restrictions for direct applications of un-composted waste to public lands.	Potential increase in water use associated with waste treatment processes.
MOB-01	Emission Reductions at Commercial Marine Ports (NOx, SOx, CO)	Financial incentives for cleaner vessels, vehicles, and use of alternative fuels or fuel additives at marine ports.	Accidental spills of alternative fuels/additives could affect surface and ground water quality.
MOB-02	Emission Reductions at Rail Yards and Intermodal Facilities (NOx, PM)	Acceleration of the penetration of zero and near-zero emission locomotives and the use of alternative fuels and fuel additives.	Accidental spills of alternative fuels/additives could affect surface and ground water quality.
MOB-03	Emission Reductions at Warehouse Distribution Centers (all pollutants)	Use of incentives, regulatory rules, and promotion of hybrid technologies to increase zero and near zero emission equipment in/around warehouse.	Accidental spills of alternative fuels could affect surface and ground water quality.
MOB-04	Emission Reductions at Commercial Airports (all pollutants)	Incentivizing zero and near-zero technologies like alternative fuels, diesel PM filters, and low-emitting engines.	Accidental spills of alternative fuels could affect surface and ground water quality.
MOB-05	Accelerated Penetration of Partial-Zero and Zero Emissions Vehicles (VOC, NOx, CO)	Incentivizing the "Clean Vehicle Rebate Project" to promote use of vehicles with zero and near-zero emissions.	Accidental spills of alternative fuels could affect surface and ground water quality.
MOB-07	Accelerated Penetration of Partial-Zero and Zero Emission Light-Heavy and Medium-Heavy Duty Vehicles (NOx, PM)	Early introduction of zero and near-zero emission vehicles such as hybrids and electric operated vehicles.	Accidental spills of alternative fuels could affect surface and ground water quality.
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program (NOx, PM)	Incentivizing the use of zero emission technologies, the building of electric or magnetic power into roadway infrastructure to reduce emissions.	Accidental spills of alternative fuels could affect surface and ground water quality.
MOB-10	Extension of the SOON Provision for Construction/Industrial Equipment (NOx)	Incentivizing SOON program and phasing in vehicles that meet Tier 4 standards in place of older, high emitting equipment.	Accidental spills of alternative fuels could affect surface and ground water quality.

TABLE 4.4-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WATER IMPACTS
MOB-13	Off-Road Mobile Source Emission Reduction Credit Generation Program (NOx, SOx, PM)	Acceleration of the penetration of zero and near-zero off-road mobile sources as well as the use of alternative fuels and fuel additives	Accidental spills of alternative fuels could affect surface and ground water quality.
EGM-01	Emission Reductions from New Development or Redevelopment Projects (all pollutants)	Accelerating the penetration of zero and near-zero emission technologies in new or redevelopment projects, and the use of things like dust control, alternative fuels, diesel PM filter, low-emitting engines, low VOC materials and mitigation fees.	Accidental spills of alternative fuels could affect surface and ground water quality; potential increase in water use associated with dust control.
TXM-01	Control of Metal Particulate from Metal Grinding Operations (TACs, PM)	Construction of enclosures and control equipment such as exhaust ventilation with dust collectors, use of wet methods like wet-wiping or wet sweeping to prevent dust release and other measures like vacuuming with a HEPA filter.	Potential increase in water use from applying wet methods to prevent dust.
TXM-02	Control of Toxic Metal Particulate Emissions from Plating and Anodizing Operations (TACs, PM)	Modification of existing equipment, construction of enclosures and control equipment, such as exhaust ventilation with dust collectors, and the implementation of new measures like vacuuming with a HEPA filter and wet-wiping to prevent dust emission.	Potential increase in water use from applying wet methods to prevent dust.
TXM-04	Control of Toxic Metal Particulate Emissions from Contaminated Soils (TACs, PM)	Construction and operation of enclosures and control equipment, such as HEPA filters, and wet methods to prevent dust release.	Potential increase in water use from applying wet methods to prevent dust.
TXM-05	Control of Toxic Metal Particulate Emissions from Laser Plasma Cutting (TACs, PM)	Construction of enclosures and control equipment, such as HEPA filters.	Potential increase in water use from applying wet methods to prevent dust.
TXM-06	Control of Toxic Emissions from Metal Melting Facilities (TACs, PM)	Construction of enclosures and control equipment, such as exhaust ventilation with filters/baghouses, and the implementation of methods to prevent dust release including wet-wiping and vacuuming with HEPA filters.	Potential increase in water use from applying wet methods to prevent dust.

TABLE 4.4-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WATER IMPACTS
TXM-07	Control of Lead Emissions from Stationary Sources (TACs, PM)	Construction and implementation of control equipment to minimize lead emissions as well as the use of best management practices.	Potential increase in water use changes due to changes in housekeeping methods.
TXM-08	Control of Emissions from Chemical Stripping of Cured Coatings (Methylene Chloride)	Reformulation of solvents and use of activated carbon.	Potential increases in water use if coatings are reformulated with water and water is used for clean-up; potential impacts to water quality due to disposal of clean-up water and products reformulated with exempt or non-exempt solvents.
ORLD-01	Advanced Clean Cars 2 (NOx, ROG)	Expanded/new standards for clean cars to increase zero and near-zero emission vehicles which could include the use of alternative fuels.	Accidental spills of alternative fuels could affect surface and ground water quality.
ORLD-03	Further Deployment of Cleaner Technology: On-Road Light-Duty Vehicles (NOx, ROG)	Acceleration of the penetration of zero and near-zero emission vehicles, including those vehicles that use alternative fuels and fuel additives.	Accidental spills of alternative fuels/additives could affect surface and ground water quality.
ORHD-02	Low-NOx Engine Standards (NOx)	Implementation of technologies to reduce emissions from heavy duty engines including the use of alternative fuels and fuel additives.	Accidental spills of alternative fuels/additives could affect surface and ground water quality.
ORHD-04	Advanced Clean Transit (NOx, ROG)	Implementation of technologies to accelerate the penetration of zero and near-zero emission buses into the fleet, including the use of alternative fuels.	Accidental spills of alternative fuels could affect surface and ground water quality.
ORHD-05	Last Mile Delivery (NOx, ROG)	Acceleration of the penetration of zero and near-zero emission last mile delivery trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Accidental spills of alternative fuels could affect surface and ground water quality.
ORHD-06	Innovate Technology Certification Flexibility (NOx)	Acceleration of the penetration of zero and near-zero emission heavy duty trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Accidental spills of alternative fuels could affect surface and ground water quality.

TABLE 4.4-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WATER IMPACTS
ORHD-07	Zero Emission Airport Shuttle Buses (NOx, ROG, PM2.5)	Implementation of technologies to accelerate the penetration of zero and near-zero emission airport shuttles, including the use of alternative fuels.	Accidental spills of alternative fuels could affect surface and ground water quality.
ORHD-08	Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission heavy duty vehicle engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Accidental spills of alternative fuels could affect surface and ground water quality.
ORHD-09	Further Development of Cleaner Technology: On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Accidental spills of alternative fuels could affect surface and ground water quality.
ORFIS-01	More Stringent National Locomotive Standards (NOx, ROG)	Use of Tier 5 Control equipment such as SCRs, alternative fuels, DPM filters and electric batteries.	Accidental spills of alternative fuels could affect surface and ground water quality.
ORFIS-04	At-Berth Regulation Amendments (NOx, ROG)	Further reduce emissions from ships at berth and advance the use of near-zero and zero emission technologies	Accidental spills of alternative fuels while ships are at berth could affect sea water quality.
ORFIS-05	Further Development of Cleaner Technology: Off-Road Federal and International Sources (NOx, ROG)	Measure to accelerate deployment of cleaner marine, rail and aircraft off-road technology by increasing incentive program.	Accidental spills of alternative fuels could affect surface and ground water quality.
OFFS-01	Zero-Emission Off-Road Forklift Regulation Phase 1 (NOx, ROG)	Measure to accelerate the penetration of zero emission technologies to be used in off road forklifts.	Accidental spills of alternative fuels could affect surface and ground water quality.
OFFS-05	Small Off-Road Engines (NOx, ROG)	Measure to accelerate the penetration of zero emission technologies to be used in small off-road engines.	Accidental spills of alternative fuels could affect surface and ground water quality.
OFFS-07	Low Emission Diesel Requirement (NOx, PM)	Reformulation of diesel fuel to lower amount of emissions.	Accidental spills of reformulated fuels could affect surface and ground water quality.
OFFS-08	Further Deployment of Cleaner Technologies: Off-Road Equipment(NOx, ROG, PM2.5)	Measure to accelerate the implementation of zero emission technologies in off-road equipment.	Accidental spills of alternative fuels could affect surface and ground water quality.

TABLE 4.4-1 (concluded)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WATER IMPACTS
CPP-01	Consumer Products Program (ROG)	Reformulation of consumer products.	Potential increases in water use if coatings are reformulated with water and water is used for clean-up; potential impacts to water quality due to disposal of clean-up water and products reformulated with exempt or non-exempt solvents.

4.4.3 SIGNIFICANCE CRITERIA

The NOP/IS (Appendix A) concluded that the 2016 AQMP would not: substantially alter the existing drainage pattern or substantially increase the rate or amount of surface runoff in a manner that would result in substantial flooding, siltation, or flooding on- or off-site; create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial sources of polluted runoff; place housing or structures in a 100-year flood hazard area or flood hazard area which would impede flows; or expose people or structures to a significant risk of loss, injury, or death involving flooding. However, implementation of the 2016 AQMP would be considered to have significant hydrology and water quality impacts if any of the following conditions occur:

Water Demand:

- The existing water supply does not have the capacity to meet the increased demands of the project, or the project would use more than 262,820 gallons per day of potable water.
- The project increases demand for total water by more than five million gallons per day.

Water Quality:

- The project will cause degradation or depletion of ground water resources substantially affecting current or future uses.
- The project will cause the degradation of surface water substantially affecting current or future uses.
- The project will result in a violation of National Pollutant Discharge Elimination System (NPDES) permit requirements.
- The capacities of existing or proposed wastewater treatment facilities and the sanitary sewer system are not sufficient to meet the needs of the project.

4.4.4 IMPACT ANALYSIS

4.4.4.1 Water Quality Impacts – Wastewater Treatment Capacity

The 2016 AQMP includes control measures for stationary sources that may require additional air pollution control equipment with the potential to generate additional wastewater (CMB-05 and BCM-01) associated with the use of wet electrostatic precipitators (ESPs) or wet gas scrubbers (WGS). The use of wet ESPs and WGSs has been shown to be effective at reducing PM2.5 emissions and is a potential control methodology, though the extent of the use of these types of control equipment is unknown.

To meet the lowered future VOC content limits as a result of implementing control measures CTS-01, FLX-02, TXM-08, and CPP-01, products are expected to be reformulated. While reformulated products would be expected to have lower VOC contents, the reformulations could have widely varying compositions depending on the chemical characteristics of the replacement solvents chosen. For example, most reformulations are expected to be made with water, but other reformulations could be made with an exempt solvent such as acetone or other solvents that are exempted from the definition of a VOC in SCAQMD's Rule 102. As a result, for those products reformulated with water, then water could also be used for clean-up and the resultant wastewater material could be disposed of into the public sewer system. Further, other reformulated products made with exempt or non-exempt solvents may also lead to adverse impacts to water quality if clean-up and disposal of reformulated solvents, coatings, or products are not handled properly. However, the use of water to reformulate coatings, solvents, and products would generally lead to products that would be less toxic than products reformulated with either exempt or non-exempt chemicals (that are typically petroleum-based) and as such, generate fewer impacts to water quality. In addition, CTS-01 could result in the use of UV-cured resins and coatings which would not be expected to use water or generate wastewater. Lastly, because the development of reformulated products is expected to require the same types of equipment (e.g., spray guns, rollers, and brushes) currently used in coating operations, the corresponding clean-up practices employed to clean the coating equipment would also not be expected to change.

Table 4.4-2 estimates the potential increase of wastewater to be received by wastewater treatment plants in the Basin as a result of implementing the 2016 AQMP control measures that pertain to product reformulations. The estimated increase in wastewater generated is considered to be within the projected capacity of the local wastewater treatment plants within the Basin. Wastewater generated from the reformulation of coatings and products is estimated to be about 31,273 gallons per day as compared to the estimated wastewater treatment capacity of about 1,911 million gallons in the Basin. These are expected to be "worst-case" estimated because a number of products on the market are already made with water or low VOC materials, so the need to reformulate products may be minor or not required at all.

As indicated in Table 4.4-1, several control measures proposed in the 2016 AQMP may require add-on air pollution control equipment (CMB-05 and BCM-01) such as wet electrostatic precipitators (ESPs) or wet gas scrubbers (WGS), which have been shown to be effective at reducing PM2.5 emissions. If installed, wet ESPs and WGSs would require water to operate and thus, would result in the generation of wastewater. While the extent of the use of these types of control equipment to be installed and operated in the future is unknown, there are facilities that currently operate these technologies. For example, one wet ESP with one WGS were installed on the Fluid Catalytic Cracking Unit (FCCU) at the ConocoPhillips Refinery to reduce SOx emissions, as well as PM10 and PM2.5 emissions. The FCCU is a large source of emissions and the wet ESP and WGS installed were sized accordingly. The environmental analysis for this project indicated that the expected wastewater discharge from the combined operation of the wet ESP and WGS at ConocoPhillips was about 70 gallons per minute (about 100,800 gallons per day) (SCAQMD, 2007). Wet ESPs and WGSs of this size are primarily designed for large sources within the Basin (e.g., refineries and other large manufacturing facilities), but these technologies can also be scaled down for use on smaller sources. Thus, if the 2016 AQMP control measures encourage the installation of 20 additional wet ESP /WGS systems of this size, about two million gallons per day of wastewater would be generated. However, wastewater from larger facilities such as refineries is often treated at existing wastewater treatment facilities operated by the facility, so increased wastewater may not be discharged to publicly owned treatment facilities. However, making the conservative assumption that the 2016 AQMP could result in the construction and installation of 20 large-scale wet ESP/WGS systems, the estimated increase in wastewater would be well within the existing wastewater treatment capacity within the Basin (Table 4.4-2).

TABLE 4.4-2

Projected Wastewater Impacts from 2016 AQMP Control Measures

Control Measure	**POTW Treatment Capacity** (mgd)[(a)]	**Estimated Affected Coating Usage[(b)]** (gal per year)	**Projected Wastewater Flow[(c)]** (gallon per year)	**Projected Wastewater Flow** (gpd)	**Total Impacts** (% Increase to POTW Capacity)
CTS-01/ FLX-02, TXM-08	1,911.3	7,610,000	7,610,000	20,849	0.001
CPP-01	1,911.3	3,805,000	3,805,000	10,425	0.0005
Total Wastewater from Reformulated Materials	1,911.3	11,415,000	11,415,000	31,273	0.002
CMB-05, BCM-01	1,911.3	--	--	2,016,000	0.105
Total for all Control Measures:				2,078,547	0.109

(a) See Table 3.5-5, POTW = Publicly Operated Treatment Works.
(b) SCAQMD, 2012. Assuming same volume of materials impacted under the 2012 AQMP PEIR provides a conservative estimate of wastewater use as a number of the materials may have already been reformulated.
(c) Assume one gallon of wastewater is generated per each gallon of material.

The potential increase in the volume of wastewater estimated as a result of implementing all of the control measures in the 2016 AQMP identified as having potential wastewater impacts is also included in Table 4.4-2, and is estimated to be 2.1 million gallons per day, which represents about a 0.1 percent increase in wastewater generated within the Basin. Further, the increase in wastewater is well within the capacity of the existing wastewater treatment plants of about 1,911 million gallons. Therefore, the wastewater impacts pertaining to the existing capacity of wastewater treatment plants are expected to be less than significant.

4.4.4.2 Water Quality Impacts – Wastewater Discharge

For industrial facilities, a 25 percent increase in wastewater above discharge permit limits would trigger a permit revision to a facility's industrial waste discharge permit and this would be considered a significant adverse wastewater impact. Facilities that would install WGS and ESPs are likely to be larger industrial facilities that would be covered by industrial waste discharge permits and most large industrial facilities (e.g., refineries) have their own wastewater treatment system. The treatment of wastewater at POTWs is accomplished under the control of numerous regulatory permits (e.g., National Pollutant Discharge Elimination System Permits or NPDES Permits) which require monitoring of wastewater quality on a frequent basis. For example, NPDES permit requirements of a local refinery requires monthly sampling for arsenic, cadmium, chromium, copper, cyanides, lead, mercury, nickel, zinc, silver, total phenol, pH, dissolved sulfides, chlorides, suspended solids, chemical oxygen demand, biochemical oxygen demand, and ignitability. Daily sampling is required for ammonia, oil and grease, selenium, and thiosulfate. Wastewater that does not meet permit limits must be re-treated and monitored again prior to discharge.

In addition, wastewater impacts for refinery facilities that had the potential to install WGS or Wet ESP technologies were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. Each affected refinery provided their wastewater discharge limits and these limits were compared to each refinery's estimated potential increase in wastewater that may result from installing WGS or Wet ESP technologies. The peak percentage increase from baseline levels was approximately nine percent. Since all of the affected facilities were shown to have a potential wastewater increase well below 25 percent, no modifications to any existing wastewater discharge permits are were anticipated at that time. Thus, the December 2015 Final PEA concluded that the operational impacts on each affected refinery's wastewater discharge and the Industrial Wastewater Discharge Permit would be less than significant. Similarly, for the analysis in this Program EIR, any facility operator that has increased wastewater generation due to the installation of WGS or Wet ESP technology, would be expected to have similar or fewer impacts than what was previously analyzed in the December 2105 Final PEA. Further, operators of affected facilities that install and operate WGS or Wet ESP technology would continue to comply with existing wastewater treatment requirements of the applicable Regional Water Quality Control Board or sanitation district. Therefore, wastewater generated from industrial facilities as a result of implementing control measures in the 2016 AQMP is not expected to result in significant water quality impacts.

ORFIS-04 could require additional controls to reduce emissions from ships at berth. The ports require all tenants to comply with applicable pollution control measures. Tenants are required to operate in accordance with industrial Storm Water Pollution Prevention Plans (SWPPP) and municipal stormwater and urban runoff ordinances and permits. Port operators would be required to implement water pollution control measures in compliance with the each port's stormwater program. In addition, monitoring would be conducted under SWPPP to observe the quality of stormwater runoff discharged into the harbor. This would allow the ports to ensure that the quality of any runoff would comply with the permit conditions and verify that Best Management Practices are performing as anticipated. Existing regulatory controls for runoff and storm drain discharges are designed to reduce impacts on water quality. These measures also minimize the potential for water quality impacts associated with releases. Based on the existing regulatory requirements, water quality impacts from the requirement to install or use additional air pollution control equipment at the ports is not expected to result in significant water quality impacts.

Further, since no changes to existing wastewater treatment permits are expected to be required, the additional use of air pollution control equipment is not expected to generate significant adverse water quality impacts.

4.4.4.2.1 Coatings

Lowering the VOC content limit of coatings at affected facilities will have no direct or indirect impact water quality because the manufacture and application of reformulated coatings would not expected to change the current coating manufacturing processes, application practices by end users, or alter the coating formulations in a manner that would be more detrimental to water quality. Instead coating manufacturers will likely replace ingredients in conventional coating formulations with water or similar solvent-based compounds. In the past, the SCAQMD has received comments that the increased use of water-based reformulations to meet lower VOC content limits will cause waste generated from reformulated coatings to be improperly or illegally disposed of and that some of this waste would reach groundwater, storm drains, or sewer systems. However, there are no data to support this contention. In any event, there are several reasons why no significant increase over current disposal practices, including improper or illegal disposal, would occur solely because increased amounts of reformulated water-borne coatings may be made available by coating manufacturers. For example, results from a survey of contractors determined that a majority of waste material is either disposed of properly as required by the coating manufacturer's MSDS instructions or recycled regardless of type of coating and regardless of whether the coating is reformulated. Based upon these results, there is no reason to expect that paint contractors will change their disposal practices, especially those that currently dispose of these wastes properly, upon implementation of the various control measures in the 2016 AQMP. Based on discussions with coating manufacturers, the trend in developing coatings is to replace toxic/hazardous solvents with equal or less toxic/hazardous solvents. Therefore, disposal of reformulated coatings and associated clean-up materials is expected to contain less hazardous materials than conventional coatings, thereby reducing the potential for waste reaching groundwater, storm drains, or sewer systems tto be treated at wastewater treatment plants. Thus, the reformulation of materials is not expected to generate significant adverse water quality impacts.

4.4.4.2.2 Accidental Spills

Accidental spills from a number of control measures could result in water quality impacts to surface or ground water resources, including MOB-01, MOB-02, MOB-03, MOB-04, MOB-05, MOB-07, MOB-09, MOB-10 , EGM-01, ORLD-01,ORLD-03, ORHD-02, ORHD-04, ORHD-05, ORHD-06, ORHD-07, ORHD-08, ORHD-09, ORFIS-01, ORFIS-05, OFFS-01, OFFS-05, OFFS-07, and OFFS-08. A spill at any of the affected facilities could occur under upset conditions such as an earthquake, tank rupture, or tank overflow. Spills could also occur from corrosion of containers, piping and process equipment, and leaks from seals or gaskets at pumps and flanges. A major earthquake would be a potential cause of a large spill. Other causes could include human or mechanical error. Construction of the vessels, and foundations in accordance with the California Building Code requirements helps structures to resist major earthquakes without collapse, but may result in some structural and non-structural damage following a major earthquake. As required by U.S. EPA's spill prevention control and countermeasure regulations, all of the affected facilities are required to have emergency spill containment equipment and would implement spill control measures in the event of an earthquake. Storage tanks typically have secondary containment such as a berm, which would be capable of containing 110 percent of the contents of the storage tanks onsite. Therefore, should a rupture occur, the contents of the tank would be collected within the containment system and pumped to an appropriate storage tank.

Spills at affected industrial or commercial facilities would be collected within containment structures. Large spills outside of containment areas at affected facilities that could occur when transferring the material from a transport truck to a storage tank are expected to be captured by the process water system where they could be collected and controlled. Spilled material would be collected and pumped to an appropriate tank or sent off-site if the materials cannot be used on-site. The existing rules and requirements that limit the extent or prevent spills are expected to minimize impacts on water quality to less than significant levels. For this reason, accidental spills are not expected to create significant water quality impacts.

4.4.4.2.3 Alternative Fuels

The following control measures in the 2016 AQMP may contribute to the increased use of alternative fuels in the SCAQMD's jurisdiction: MOB-01, MOB-02, MOB-03, MOB-04, MOB-05, MOB-07, MOB-09, MOB-10, EGM-01, ORLD-01,ORLD-03, ORHD-02, ORHD-04, ORHD-05, ORHD-06, ORHD-07, ORHD-08, ORHD-09, ORFIS-01, ORFIS-05, OFFS-01, OFFS-05, OFFS-07, and OFFS-08. These control measures are expected to generally result in the increased penetration of electric vehicle vehicles, but may also result in the increased use of alternative fuels (e.g., biodiesel fuels, compressed natural gas, liquefied natural gas, and hydrogen).

SCAQMD Rule 431.2 - Sulfur Content of Liquid Fuelslimits the sulfur content in diesel fuel used in stationary and mobile sources to 15 ppm by weight. Thus, diesel fuels currently used in California are low sulfur fuels. As such, there is no evidence that the use of low sulfur diesel fuels has resulted in any water quality impacts, as the only difference in the fuel available on the market is the reduced concentration of sulfur. Further, even if diesel fuel is reformulated to also have lower NOx and PM emissions, as would be required by control measure OFFS-07, the reformulated diesel fuel would not likely result in any new significant water quality impacts in the event of a spill.

In general, alternative fuels are expected to be less toxic than conventional fuels and follow a similar path as the low sulfur diesel. Biodiesel is a fuel derived from biological sources such as vegetable oils or animal fats. Biodiesel can be used pure or blended with conventional diesel. Because the biodiesel typically comes from vegetable oils or animal fats, it is generally less toxic and more biodegradable than conventional diesel, so the water quality impacts from a spill of biodiesel would be less than a spill of conventional diesel. The most common blended biodiesel is B20, which is 20 percent biodiesel and 80 percent conventional diesel. Therefore, the potential water quality impacts from the transport and storage of biodiesel and biodiesel blends is not expected to be substantially different than the transport and storage of conventional diesel.

The other types of alternative fuels that may be used as part of implementing some control measures in the 2016 AQMP include compressed natural gas, liquefied natural gas and hydrogen. Because all of these fuels exist as a gas at standard temperatures and pressures, a leak of any of these fuels would result in an airborne release, and not a release that could adversely affect water quality. There are a number of rules and regulations currently in place that are designed to minimize the potential impacts from underground leaking storage tanks and spills from fueling activities, including requirements for the construction of the storage tanks, requirements for double containment, and installation of leak detection systems. These regulations would also apply to any leaks of alternative fuels from storage tanks. Thus, the use of alternative fuels is not expected to result in any greater adverse water quality impacts than the current use of conventional fuels like diesel or gasoline.

4.4.4.2.4 Electric Vehicles

Implementation of the 2016 AQMP could contribute to an increased use of electric vehicles and other mobile sources. Table 4.4-3 estimates the number of electric vehicles that are expected to be put into service as part of implementing the SCAQMD and CARB Control Measures. Since some batteries contain toxic materials, water quality impacts are possible if the batteries are disposed of in an unsafe manner, such as by illegal dumping or by disposal in a landfill.

As interest in the use of electric vehicles has increased over the years, battery technologies have been developing and improving. Most battery technologies employ materials that are recyclable, since regulatory requirements and market forces encourage recycling. California laws create incentives and requirements for disposal of recycling of batteries as follows.

- Under CARB regulations, to certify either a new ZEV or retrofit an existing ZEV, automakers must complete CARB's certification application, which must include a battery disposal plan. Thus, current regulations require ZEV manufacturers to take account for the full life-cycle of car batteries and to plan for safe disposal or recycling of battery materials. For example, Toyota has offered $200 per battery to minimize illegal disposal of batteries.

- California and federal law requires the recycling of lead-acid batteries (California Health & Safety Code §25215). Spent lead-acid batteries being reclaimed are regulated under 22 CCR §66266.80 and 66266.81, and 40 CFR part 266, Subpart G.

- California law requires state agencies to purchase car batteries made from recycled material (Public Resources Code §42440).

- California passed the Household Universal Waste Rule in February 2006, which prohibits the landfill disposal household wastes such as batteries, electronic devices, and fluorescent light bulbs by anyone.

TABLE 4.4-3

Estimated Increase in Electric Mobile Sources Due to the 2016 AQMP

CONTROL MEASURE NO.	CONTROL MEASURE DESCRIPTION	ESTIMATED INCREASE IN VEHICLES	
		2023	**2031**
MOB-05, MOB-14, ONLD-01, and ORLD-03	Accelerated Penetration of Partial-Zero and Zero Emission Vehicles	357,000	714,000
ORHD-04	Advanced Clean Transit, Accelerated Penetration of Partial-Zero and Zero Emission Buses	11,000	11,000
MOB-06, MOB-07, MOB-08, ORHD-03, ORHD-04, ORHD-05, ORHD-06, ORHD-08	Accelerated Penetration of Partial-zero and Zero Emissions Light, Medium and Heavy-Duty Trucks	115,000	245,000
MOB-01, MOB-02, MOB-03, MOB-04, MOB-13 OFFS-01, OFFS-04, OFFS-06	Accelerate the Penetration of Zero Emission TRUs, Forklifts and Ground Support Equipment	50,000	100,00
OFFS-02, OFFS-08	Further Deployment of Cleaner Technologies for Larger Off-Road Diesel/Gasoline Equipment	30,000	60,000
MOB-10, OFFS-03, OFFS-08	Penetration of Zero Emission Off-Road Construction and Industrial Equipment	20,000	40,000

Existing battery recovery and recycling programs have limited the disposal of batteries in landfills. For example, the recycling of lead-acid and nickel-cadmium batteries is already a well-established activity. One secondary lead smelter (facilities that recycle lead-bearing materials) is currently located within the Basin. Another secondary lead smelter in the Basin ceased operations in 2015. The secondary lead smelter receives spent lead-acid batteries and other lead bearing material and processes them to recover lead and polypropylene (from the battery casings). Acid is collected and recycled as a neutralizing agent in the wastewater treatment system. Other facilities available for battery recycling are located outside of the Basin. Further penetration of partial-zero and zero emission mobile sources in the Basin is expected to result in a reduction in the use of lead-acid batteries and a subsequent reduction in the lead-acid batteries that need to be recycled, after the vehicle/equipment is scrapped or has left the Basin.

Implementation of the 2016 AQMP would be expected to result in an increased use of electric vehicles (EVs) and hybrid vehicles (hybrids) which use nickel-metal hydride (NiMh) and lithium ion (Li-ion) batteries, instead of lead-acid batteries. Nearly all hybrids use NiMH batteries. Due to the potential of obtaining higher specific energy and energy density, most electric vehicles use Li-ion batteries (Young, et al., 2013). EVs and hybrids both use electricity as part of their fuel system. EVs rely purely on electric power stored in batteries. Hybrids also use batteries as part of their fuel supply; however, hybrids supplement their electrical needs by using gasoline engines to generate either mechanical or electric power on demand. Since gasoline is a conventional fuel, any difference in water quality impacts associated with hybrid vehicles would be from the batteries. The electrolyte in NiMh batteries is an alkaline electrolyte, usually potassium hydroxide. The electrolyte in Li-ion batteries is a lithium salt, while the electrolyte in lead-acid batteries is a sulfuric acid/water blend.

Batteries in hybrids are much larger than batteries in conventional vehicles. The current hybrid batteries weigh about 110 pounds and are composed of NiMH batteries which are charged by an internal combustion engine driven generator and/or by a regenerative braking system that captures power from deceleration and braking. These batteries have a longer life than conventional lead acid batteries. Most of these high voltage batteries are warranteed for 10 years or 150,000 miles under California regulations. Toyota has reported that its battery packs have lasted for more than 180,000 miles in testing. A large number of Ford Escape Hybrid and Toyota Prius taxicabs in New York and San Francisco have logged over 200,000 miles on their original battery packs (Edmunds, 2013).

The recycling of hybrid battery packs is still in its infancy as there have not been many battery packs surrendered for recycling. The NiMH batteries found in hybrid vehicles are basically "zero-landfill" products, meaning that whatever cannot be recycled is typically consumed in the recycling process. The primary metals recovered during recycling are nickel, copper, and iron. Some principal rare earth metals, neodymium and lanthanum, are also recovered (Edmunds, 2014). Improper disposal of NiMH batteries poses less environmental hazard than that of lead-acid or nickel-cadmium batteries because of the absence of lead and cadmium, which are considered to be toxic. Most industrial nickel is recycled, due to the relatively easy retrieval of the magnetic element from scrap using electromagnets, and due to its high value.

The Li-ion batteries are more common in electric vehicles and becoming more popular in hybrids. Li-ion batteries are much larger than batteries in conventional vehicles and range from approximately 400 pounds (in models such as the Chevy Volt and BMWi3) to 1,200 pounds (for the Tesla S), depending on the type of vehicle (Battery University, 2016). Li-ion batteries are between 70 and 100 percent recyclable, depending on the particular chemistry of the batteries. There are a number of different types of Li-ion batteries in use, and more are being developed. The battery types available are differentiated by the chemical formulation of the electrodes including, but not limited to, cobalt dioxide, nickel-cobalt-manganese (NCM), nickel-cobalt-aluminum (NCA), manganese oxide spinel (MnO), iron phosphate (FePo) and various different combinations of these elements. The makers of the Nissan Leaf, BMWi3, and other electric vehicles use lithium manganese batteries with a nickel, manganese, cobalt blend. Tesla uses a nickel cobalt aluminum battery that delivers more energy (Battery University, 2016). The components of Li-ion batteries that cannot be recycled are mostly consumed as fuel in the furnaces that are used to melt down the metals, which include cobalt, copper, iron, nickel, manganese, and lithium (Edmunds, 2014).

Because Li-ion batteries have a potential for after-automotive use, destructive recycling can be postponed for years even after an EV or hybrid battery can no longer hold and discharge sufficient electricity to power a car's motor. The battery pack can still carry a tremendous amount of energy. Battery manufacturers project that the battery packs will still be able to operate at about 80 percent of capacity the time they must be retired from automotive use (Edmunds, 2014). For example, several major power utilities are working with companies (General Motors, Ford, Toyota, and Nissan) to explore the use of batteries for stationary storage of the power produced in off-peak periods by wind turbines and solar generation stations. Li-ion packs are also being tested as backup power storage systems for retail centers, restaurants, and hospitals, as well as residential solar systems (Edmunds, 2014). Auto companies are partnering with battery, recycling, and electronics firms to figure out and develop post-automotive markets and applications for Li-ion battery packs (Green Car Reports, 2016). With the opportunity for other uses, Li-ion battery recycling may not be as necessary as recycling of lead-acid batteries.

The switch to electric batteries has the potential to create water quality impacts from improper disposal. Although some electric cars have lead acid batteries, the increased use of EVs and hybrids will result in an overall decrease in the use of lead acid batteries, which use sulfuric acid/ blends as electrolytes and have a much shorter lifespan than NiMH or Li-ion batteries. NiMH and Li-ion batteries are generally recycled because the material within the batteries is valuable. Further some manufacturers offer incentives to prevent illegal disposal of the batteries. Most car manufacturers offer a program to take back used or damaged battery packs, including Toyota and Nissan (Green Car Reports, 2016).

Retriev Technologies (formerly Toxco) operation appears to be the recycler most widely used by companies that sell hybrids and EVs in North America when batteries reach their end of life. Retriev Technologies is the only company in North America with the capacity to recycle Li-ion batteries and they received federal grant to build and operate an advanced lithium battery recycling facility at their existing Lancaster, Ohio site (Edmunds, 2014). The facility uses a proprietary system to primarily recycle nickel-metal hydride batteries. Retriev Technologies also currently handles small volumes of Li-ion battery packs as they work with automakers to develop the best recycling processes. Because of the slow sales pace for EVs and hybrid cars and trucks, they expect a commercially viable market to take at least a decade to develop. Once the packs are at the proper distribution point, the recyclers break down their constituent parts to salvage any wiring, electrical components and plastics that can be separately recycled. A high temperature process is used to separate the battery content into metal alloys and slag, which concentrates the rare earth elements that the batteries contain (Edmunds, 2014).

While the switch to electric batteries has the potential to create water quality impacts from improper disposal, but the increased use of EVs and HVs will result in a concomitant decrease in the use of internal combustion engines and a reduction in the impacts of such engines. For instance, a decreased use of internal combustion engines such as gasoline- or diesel-burning engines will also result in a decreased generation of used engine oil since electric motors do not employ oil as a lubricant.

Specifically, approximately 282,900 tons per year of waste oil was generated in the Basin in 2014 (see Subchapter 3.7, Solid and Hazardous Waste, Table 3.7-10). Because of the widespread use and volume of waste oil, a portion of waste oil is illegally disposed of via sewers, in waterways, on land, and in landfills. Waste oil that is illegally disposed can contaminate the environment (via water, land, or air). In addition, a substantial amount of motor oil leaks from vehicles driving on roadways and this motor oil is eventually washed into storm drains which empty into the ocean.

Since electric motors do not require motor oil as a lubricant, replacing internal combustion engines with electric engines will eliminate the impacts of motor oil use and disposal. For example, a 50 percent penetration of light-duty electric vehicles will result in a corresponding 50 percent reduction in the release of motor oil into the environment due to illegal disposal and a 50 percent reduction in the generation of waste oil. Release of contaminants due to engine oil that burns up in, or leaks from engines or due to the burning of recovered engine oil for energy generation will also be reduced. Additional use of electric vehicles is expected to have a beneficial environmental impact by reducing the amount of motor oil used, recycled, potentially illegally disposed, or washed into storm drains and ending up in the ocean.

In conclusion, the illegal disposal of batteries from EVs and hybrids has the potential to result in significant water quality impacts by allowing toxic or hazardous metals or acids to leach into surface or ground waters. However, because battery recycling is required by law and because they have value, the illegal or improper disposal of batteries is expected to be uncommon. For example, because some manufacturers pay for used EV/hybrid batteries, the value, size, and length of life of NiMH and Li-ion batteries are such that recycling is expected to be more predominate than with lead acid batteries. Therefore, the use of EVs and hybrids are not expected to result in an increase in the illegal or improper disposal of batteries because these types of batteries are required to be recycled and thus, reducing the potential potential water quality impacts cause by illegal disposal. Based on the foregoing analysis, less than significant adverse water quality impacts are expected from the increased use of EV and hybrid vehicles.

4.4.4.2.5 Sodium Bisulphate

Control measure BCM-04 would control ammonia emissions from livestock operations through the application of sodium bisulfate (SBS). SBS is a hydroscopic salt that acts an acidifier. SBS has been used to reduce pH levels in dairy bedding (e.g., hay or straw) and manure, which in turn reduces bacterial and ammonia levels. In California, SBS, has also been used by dairies in Tulare, Fresno, Merced, Stanislaus, San Joaquin, Kings, Kern, San Bernardino, Riverside, San Benito, and Sacramento counties, to prevent cow lameness and nuisance flies.

When SBS is applied on manure, research indicates that most of the ammonia reductions occurred during the first day of SBS application and that the ammonia emissions continued to decrease over time with increasing levels of SBS applications. However, after 24 hours, the reduction rates declined and by day three, the ammonia emissions reduction rates were no longer different between dosages. SBS is most effective in reducing ammonia emissions from dairy corrals at either an application rate of 50 pounds per 1,000 square feet, three times per week; or 75 pounds per 1,000 square feet, two times per week. Based on historical data, application of SBS may only be needed for eight weeks out of the year; hence, seasonal or episodic application of SBS may be effective when high ambient PM2.5 levels are of concern.

While SBS is considered an irritant because of its low pH, it is safe for use in water treatment. In particular, SBS has been used as a disinfectant to prevent damage of the membrane used in reverse osmosis during water treatment. SBS is certified for treating drinking water (e.g., for chlorine removal, corrosion and scale control, and pH adjustment). SBS is used to lower the pH of water for effective chlorination, including water in swimming pools. SBS is also approved as a general use feed additive, including companion animal food. Lastly, SBS is used as a urine acidifier to reduce urinary stones in cats.

SBS is considered Generally Recognized as Safe (GRAS) by the Food and Drug Administration (FDA) and meets their definition of a natural product (FDA, 1998). The FDA has approved of SBS as a food additive and food grade SBS bisulfate is used in a variety of food products, including beverages, dressings, sauces, cake mixes, and fillings. It is also widely used in meat and poultry processing and most recently in browning prevention of fresh cut produce.

Because SBS is a salt, the amount of SBS that is applied needs to be reviewed and controlled to prevent SBS contamination of water runoff that could result in water quality impacts and reduced pH levels. SBS use should be carefully considered in areas that are sensitive to salts and/or in areas with existing high salt loading in the soils. Because SBS loses its effectiveness over time, controlled and monitored application rates of SBS are needed to minimize the potential for water runoff and related water quality impacts.

4.4.4.5 Water Demand Impacts

There are several control measures that may require or encourage the use of air pollution control technologies that could result in an increased use of water demand from wet ESPs and WGS. As indicated in Table 4.4-1, the 2016 AQMP includes stationary sources that may require add-on air pollution control equipment with the potential to increase water demand including CMB-05 and BCM-01. The use of wet ESPs and WGSs would result in an increase in water demand. The extent of the use of these types of control equipment is unknown. However, the use of wet ESPs and WGSs has been shown to be effective at reducing PM2.5 emissions.

As mentioned earlier in this chapter, one wet ESP and one WGS were installed on the FCCU at the ConocoPhillips Refinery to control sulfur oxide emissions, as well as PM10 and PM2.5 emissions. The environmental analysis for this project indicated that the expected water demand associated with the WGS was about 300 gallons per minute (432,000 gallons per day) (SCAQMD, 2007). The increase in water use for this project was shown to be greater than the significance threshold of 262,820 gallons of potable water per day. If the 2016 AQMP control measures were to encourage the development of 20 additional wet ESP/WGS systems at a similar size, the potential water demand would also exceed the five million gallons per day significance threshold for total water use. Therefore, the 2016 AQMP would result in potentially significant water demand impacts associated with wet ESP and WGS technologies.

The possible control methods for BCM-01 have yet to be determined because cost-effective controls for the majority of under-fired charbroilers have not yet been developed. BCM-01 is focused on controlling PM10 and PM2.5 emissions and control measures could include ESPs, filters, centrifugal separators, and aerosol mist nebulizers. Water scrubbing or filtering devices could be employed as add-on controls for charbroiler exhaust and these devices could require water for their operation. An alternative to these water-based control technologies is the replacement of under-fired charbroilers with a smokeless broiler, which would prevent grease from dripping onto hot burner components while cooking food. A smokeless broiler is estimated to result in a 75 percent reduction in PM10 emissions and a 71 percent reduction in VOC emissions. Thus, compliance with BCM-01 could be achieved by replacing older broilers with newer, more efficient broilers, which would not require water to operate.

Other control measures may have several control technology options to use for compliance, and these add-on air pollution control equipment options are generally not expected to result in a significant increase in water demand from their use. For example, particulate control devices such as baghouses and dry filters do not utilize water. These types of control technologies are likely to be used on smaller emission sources as they tend to be more cost effective than wet ESPs and WGSs.

Control measures ORFIS-04 and ORFIS-05 could employ WGSs, which would require water to operate, for particulate control. However, ORFIS-04 and ORFIS-05 are expected to rely primarily on the use of a variety of other control methods that do not require water for operation, including cold ironing, alternative fuels, PM filters, etc. While there are a variety of add-on air pollution control technologies available, and not all of these technologies require water for their operation, implementation of some of the control measures proposed in the 2016 AQMP is expected to result in significant adverse water demand impacts in the event that wet ESP/WGS systems are installed on large emission sources. Table 4.4-4 contains a summary of the potential water demand associated with implementing Control Measures CMB-05 and BCM-01.

Historically, potential water demand to reformulate conventional coatings into waterborne coatings and to clean up waterborne coatings has not resulted in significant adverse impacts on water demand. Using "worst-case" assumptions, increase water demand from implementing the 2016 AQMP has been estimated in Table 4.4-4 for both manufacturers of waterborne coatings and water used by consumers to clean coating equipment. As shown in Table 4.4-4, water demand associated with the manufacture and clean-up of waterborne formulations is estimated to be 62,547 gallons per day.

There are some other control measures that could result in an increase in water demand including ECC-03, ECC-04, BCM-03, BCM-07, TXM-01, TXM-02, TXM-04, TXM-05, TXM-06, and TXM-07. These control measures may encourage the use of wet methods to prevent dust release and improve housekeeping methods. ECC-03 and ECC-04 would likely result in the need for additional water to wash down the solar panels and roofs. Other types of activities that may also use water include improved housekeeping measures, best management practices, pollution controls (e.g., filters), wheel knockout and cleaning stations, and replacement with new equipment.

The environmental analysis for the control of toxic emissions from a facility in the basin that would use a wet scrubber combined with a mist eliminator was estimated to be about 3,450 gallons per day (gpd) (SCAQMD, 2015b). Assuming that an estimated 20 to 30 facilities could use this type of equipment, approximately 69,000 to 103,500 gpd of water would be needed. Individually, this increase in water demand would be less than the SCAQMD significance thresholds, but as shown in Table 4.4-4, the overall water demand from the 2016 AQMP would have a significant impact exceeding five million gallons per day of total water.

TABLE 4.4-4

Projected Water Demand from 2016 AQMP Control Measures

CONTROL MEASURE	PROJECTED WATER DEMAND[a] (BILLION GAL PER YEAR)	ESTIMATED COATING SALES[b] (GAL PER YEAR)	PROJECTED MFGR WATER DEMAND,[c] FLOW (GAL PER YEAR)	PROJECTED CLEAN UP WATER DEMAND,[d] (GALLONS PER YEAR)	TOTAL IMPACT,[e] (GALLONS PER DAY)
CTS-01	2,793	7,610,000	7,610,000	7,610,000	41,698
CPP-01	2,793	3,805,000	3,805,000	3,805,000	20,849
Estimated Total Water Demand		11,415,000	11,415,000	11,415,000	62,547
CMB-05, BCM-01	2,793	--	--	--	8,640,000[g]
BCM-03, BCM-07, TXM-01, TXM-02, TXM-04. TXM-05, TXM-06, TXM-07				69,000 – 103,500	69,000 – 103,500
Total Estimated Water Demand:					8,834,094 - 8,868,594[h]

a See Table 3.5-2. Demand is for 2035
b SCAQMD, 2012. Assuming same volume of materials impacted under the 2012 AQMP PEIR provides conservative estimate of water demand as a number of the materials may have already been reformulated.
c Assumes that one gallon of water would be used to manufacture one gallons of coating applied. This estimate includes the water used in humidifiers and for purging lines. This volume also assumes as “worst-case” scenario, that all affected coatings used in the Basin were manufactured here and does not take into consideration the fact that some affect coatings are already waterborne coatings
d Assumes that one gallon of water would be used to clean-up equipment for every gallon of coating applied.
e Total amount of manufactured and clean-up water demand.
g Assumes 20 large ESPs/WGS are installed as part of the AQMP.
h Does not include the water needed to wash solar panels and roofs. It is too speculative at the time to estimate the number of solar panels and cool roofs which would be installed due to the 2016 AQMP.

4.4.6 MITIGATION MEASURES

Based on the previous analysis, wastewater treatment facilities are expected to have sufficient capacity to handle the estimated increase in wastewater that could be generated by the 2016 AQMP. Any accidental spills and wastewater discharged due to the 2016 AQMP would not be expected to violate water quality standards and thus, these impacts would be less than significant. Furthermore, the increased use of alternative fuels, electric cars, ammonia, and SBS were also concluded to have less than significant hydrology and water quality impacts.

The water demand associated with certain air pollution control technologies the use of waterborne coatings could exceed the significance threshold of 262,820 gallons per day for potable water demand and five million gallons per day of total water demand. Thus, the overall water demand from implementing the 2016 AQMP is concluded to have significant hydrology (water demand) impacts. The source of water to meet the projected demand will vary from jurisdiction to jurisdiction but can include additional use of ground water and recycled water resources. Most of the ground water basins used for water supply are managed to minimize and prevent overdraft conditions.

The increased water demand is expected to be associated with existing sources within the Basin which already have water conveyance infrastructure. Therefore, the construction of new water conveyance infrastructure is not expected to be required.

The mitigation measures that would be implemented for water demand impacts would depend on the characteristics of individual projects, the volume of water expected to be used, the type of water to be used (e.g., potable, groundwater, recycled water) and could vary amongst jurisdictions. Typical mitigation measures would include the following types of measures:

WQ-1 Local water agencies should continue to evaluate future water demand and establish the necessary supply and infrastructure to meet that demand, as documented in their Urban Water Management Plans.

WQ-2 Project sponsors should coordinate with the local water provider to ensure that existing or planned water supply and water conveyance facilities are capable of meeting water demand/pressure requirements. In accordance with State Law, a Water Supply Assessment should be required for projects that meet the size requirements specified in the regulations. In coordination with the local water provider, each project sponsor will identify specific on- and off-site improvements needed to ensure that impacts related to water supply and conveyance demand/pressure requirements are addressed prior to issuance of a certificate of occupancy. Water supply and conveyance demand/pressure clearance from the local water provider will be required at the time that a water connection permit application is submitted.

WQ-3 Project sponsors should implement water conservation measures and prioritize the use recycled water over potable or groundwater whenever available and appropriate for end uses.

WQ-4 Project sponsors should consult with the local water provider to identify feasible and reasonable measures to reduce water consumptions.

4.4.7 IMPACTS AFTER MITIGATION

While mitigation measures could help minimize some of the water demand on an individual facility-basis, the availability of water supplies varies throughout the region; thus, not all mitigation measures will be applied in all situations. For this reason, the mitigation measures are not expected to fully eliminate the significant water demand impacts. Therefore, water demand and groundwater depletion impacts generated by the proposed project are expected to remain significant.

4.5 NOISE

4.5.1 INTRODUCTION

This subchapter examines noise impacts associated with implementing the proposed control measures in the 2016 AQMP. All control measures in the 2016 AQMP were evaluated to determine whether or not they could generate direct or indirect noise impacts based on the anticipated methods of control.

The NOP/IS for the 2016 AQMP identified the following types of control measures as having potentially significant noise impacts: 1) potential temporary changes in noise volume due to construction activities needed for installation of equipment and potential new roadway infrastructure; and 2) increased street sweeping activities.

4.4.2 2016 AQMP CONTROL MEASURES WITH POTENTIAL NOISE IMPACTS

The noise analysis in this Program EIR identifies the potential noise impacts from implementing the 2016 AQMP. All control measures were analyzed to identify the potential noise impacts. The NOP/IS determined that the proposed project could result in potentially significant noise impacts.

The 2016 AQMP strategy is primarily to further the penetration of partial-zero and zero emission technologies, as well as implement PM and TAC controls. Implementing some of the 2016 AQMP control measures could result in noise impacts in the region. Each control measure proposed in the 2016 AQMP was evaluated and 25 control measures were identified as having potential adverse noise impacts. Table 4.5-1 contains a summary of the 2016 AQMP control measures which may result in the use of compliance options that could generate significant noise impacts.

TABLE 4.5-1

Control Measures with Potential Noise Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	NOISE IMPACTS
ECC-03	Additional Enhancement in Reducing Existing Residential Building Energy Use (NOx, VOC)	Measure consists of incentives and promoting existing energy efficiency programs that would reduce criteria and GHG emissions.	Potential temporary changes in noise volume due to construction activities.
ECC-04	Reduced Ozone Formation and Emission Reductions from Cool Roof Technology	Take credit for NOx, CO, PM, CO2 and ozone emissions reductions which would occur due to compliance with required energy efficiency mandates and state regulations.	Potential temporary changes in noise volume due to construction activities.
CMB-01	Transition to Zero and Near-Zero Emission Technologies for Stationary Sources (NOx, VOC)	Incentivize transition to zero and near-zero emission technologies, specifically those in non-power plant combustion sources	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.
CMB-02	Emission Reductions from Water Heaters (NOx)	Installation of newer water heaters implementing the best available control technology.	Potential temporary changes in noise volume due to construction activities needed for installation of new water heaters.
CMB-03	Emission Reductions from Non-Refinery Flares (NOx)	Installation of newer flares implementing the best available control technology.	Potential temporary changes in noise volume due to construction activities needed for installation of new flares.
CMB-05	Further NOx Reductions from RECLAIM Assessment (NOx)	Re-examination of the RECLAIM program, including voluntary opt-out and the implementation of additional control equipment and SCR equipment.	Potential temporary changes in noise volume due to construction activities needed for installation of control equipment.
BCM-03	Further Emission Reductions from Paved Road Dust Sources (PM)	Reduction of track out from stationary sources by specifying street sweeping methods and frequency.	Increased street sweeping frequencies have the potential to increase noise frequency/volume.
BCM-05	Ammonia Emission Reduction from NOx Controls (NH3)	Installation and use of advanced catalyst technology for the conversion of ammonia	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.
BCM-06	Emission Reductions from Abrasive Blasting Operations (PM)	Construction of exhaust ventilation to a fabric filter for permanent in building abrasive blasting activities and the use of additional portable equipment like negative air machines, fume extractors, and dust collectors with HEPA filters.	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.

TABLE 4.5-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	NOISE IMPACTS
BCM-07	Emission Reductions from Stone Grinding, Cutting, and Polishing Operations (PM)	Installation of engineering controls, such as exhaust ventilation with dust collectors, the use of wet methods like wet-wiping or wet sweeping, and vacuuming with a HEPA filter.	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.
MOB-01	Emission Reductions at Commercial Marine Ports (NOx, SOx, CO)	Financial incentives for cleaner vessels, vehicles, and use of alternative fuels or fuel additives at marine ports.	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program (NOx, PM)	Incentivizing the use of zero emission technologies, the building of electric or magnetic power into roadway infrastructure to reduce emissions.	Potential temporary changes in noise volume due to construction activities related to roadway infrastructure.
TXM-01	Control of Metal Particulate from Metal Grinding Operations (TACs, PM)	Construction of enclosures and control equipment such as exhaust ventilation with dust collectors, use of wet methods like wet-wiping or wet sweeping to prevent dust release and other measures like vacuuming with a HEPA filter.	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.
TXM-02	Control of Toxic Metal Particulate Emissions from Plating and Anodizing Operations (TACs, PM)	Modification of existing equipment, construction of enclosures and control equipment, such as exhaust ventilation with dust collectors, and the implementation of new measures like vacuuming with a HEPA filter and wet-wiping to prevent dust emission.	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.
TXM-04	Control of Toxic Metal Particulate Emissions from Contaminated Soils (TACs, PM)	Construction and operation of enclosures and control equipment, such as HEPA filters, and wet methods to prevent dust release.	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.
TXM-05	Control of Toxic Metal Particulate Emissions from Laser Plasma Cutting (TACs, PM)	Construction of and operation of enclosures and control equipment, such as HEPA filters.	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.
TXM-06	Control of Toxic Emissions from Metal Melting Facilities (TACs, PM)	Construction of enclosures and control equipment, such as exhaust ventilation with filters/baghouses, and the implementation of methods to prevent dust release including wet-wiping and vacuuming with HEPA filters.	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.

TABLE 4.5-1 (concluded)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	NOISE IMPACTS
TXM-07	Control of Lead Emissions from Stationary Sources (TACs, PM)	Construction and implementation of control equipment to minimize lead emissions as well as the use of best management practices.	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.
TXM-09	Control of Toxic Emissions from Oil and Gas Well Activities (TACs, PM)	Construction of enclosures and control equipment and implementation of methods to prevent dust release such as wet-wiping and vacuuming with a HEPA filter.	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.
ORHD-05	Last Mile Delivery (NOx, ROG)	Acceleration of the penetration of zero and near-zero emission last mile delivery trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential temporary changes in noise volume due to construction activities related to roadway infrastructure.
ORHD-06	Innovate Technology Certification Flexibility (NOx)	Acceleration of the penetration of zero and near-zero emission heavy duty trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential temporary changes in noise volume due to construction activities related to roadway infrastructure.
ORHD-08	Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission heavy duty vehicle engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential temporary changes in noise volume due to construction activities related to roadway infrastructure.
ORHD-09	Further Development of Cleaner Technology: On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential temporary changes in noise volume due to construction activities related to roadway infrastructure.
ORFIS-04	At-Berth Regulation Amendments (NOx, ROG)	Further reduce emissions from ships at berth and advance the use of near-zero and zero emission technologies.	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.
OFFS-07	Low Emission Diesel Requirement (NOx, PM)	Reformulation of diesel fuel to lower amount of emissions.	Potential temporary changes in noise volume due to construction activities needed for installation of equipment.

4.5.3 SIGNIFICANCE CRITERIA

The NOP/IS (Appendix A) concluded that the 2016 AQMP would not expose people residing or working within an airport land use plan or within two miles of a public use or private airstrip to excessive noise levels and would not result in substantial noise or groundborne vibration impacts from project operation. The SCAQMD received comments on the NOP/IS relative to the operational noise analysis and conclusions reached; therefore, this impact is discussed in this section. However, implementation of the 2016 AQMP would be considered to have significant noise impacts if any of the following conditions occur:

- Construction noise levels exceed the local noise ordinances or, if the noise threshold is currently exceeded, project noise sources increase ambient noise levels by more than three decibels (dBA) at the site boundary. Construction noise levels will be considered significant if they exceed federal Occupational Safety and Health Administration (OSHA) noise standards for workers.

- The proposed project operational noise levels exceed any of the local noise ordinances at the site boundary or, if the noise threshold is currently exceeded, project noise sources increase ambient noise levels by more than three dBA at the site boundary.

4.5.4 IMPACT ANALYSIS

The existing facilities and corridors likely to be modified are located primarily in commercial and industrial zones within the southern California area. Examples of these areas include, but are not limited to, the Port of Los Angeles, Port of Long Beach, and industrial areas in and around container transfer facilities (rail and truck) near the Terminal Island Freeway, along the Alameda Corridor, as well as inland facilities and refineries. Since only existing facilities and corridors will be modified, no new facilities or corridors are anticipated as part of the proposed project, and project impacts will be temporary in nature and primarily limited to construction activities. In addition, control measures ECC-03, ECC-04, and CMB-02 would cause minor construction to install solar panels, cool roof technology, and water heaters at residences.

4.5.4.1 Construction Activities

Potential noise impacts associated with the 2016 AQMP relate primarily to construction activities which could include the construction related to the: 1) installation of air pollution control equipment, (e.g., enclosures and filtration systems); 2) replacement of existing equipment; 3) installation of roadway infrastructure (wayside power and catenary lines or other similar technologies); 4) installation of battery charging or fueling infrastructure; and, 5) installation of solar panels, cool roof technology, and water heaters. For purposes of evaluating potential noise impacts, it has been assumed herein that no new industrial facilities or corridors will be constructed, but rather some of the existing facilities and corridors will be modified to include installation of new equipment and roadway infrastructure.

Control measures that may result in noise impacts are included in Table 4.5-1. The control measures in the 2016 AQMP that may generate construction activities include: ECC-03, ECC-04,

CMB-01, CMB-02, CMB-03, CMB-05, BCM-05, BCM-06, BCM-07, MOB-01, MOB-09, TXM-01, TXM-02,TXM-04, TXM-05, TXM-06, TXM-07, TXM-09, ORHD-05, ORHD-06, ORHD-08, ORHD-09, ORFIS-04, and OFSS-07.

Control measures MOB-05, MOB-09, ORHD-05, ORHD-06, ORHD-08, and ORHD-09 could require the installation of catenary overhead electrical lines within or adjacent to existing roadways, streets, freeways, and/or transportation corridors. For purposes of evaluating potential noise impacts, the analysis in this Program EIR assumes that no new rail or truck traffic routes would be constructed, but rather some of these existing routes/corridors will be modified to include catenary overhead electrical lines or magnetic lines. In addition, a number of control measures could result in the construction of air pollution control equipment and require construction activities, including CMB-01, CMB-02, CMB-03, CMB-05, BCM-05, BCM-06, BCM-07, MOB-01, TXM-01, TXM-02, TXM-04, TXM-05, TXM-06, TXM-07, TXM-09, ORFIS-04 and OFSS-07. This may include the installation of control equipment, filtration systems, dust collectors, bag houses, and near-zero and zero emission technologies.

The existing rail and truck routes/corridors likely to be modified are located primarily in commercial and industrial zones within the Southern California area. Examples of these areas include, but are not limited to, the Port of Los Angeles, Port of Long Beach, and industrial areas in and around container transfer facilities (rail and truck) near the Terminal Island Freeway, along the Alameda Corridor, as well inland railyards near downtown Los Angeles.

Construction activities may require the use of heavy construction equipment. As specific construction projects are not currently proposed, the specific types of construction equipment necessary to implement the proposed control measures are not currently known. The noise levels from typical construction equipment are presented in Table 4.5-2.

The construction equipment noise sources identified in Table 4.5-2 represent typical construction equipment that range from 74 decibels (dBA) to over 100 dBA for activities such as pile driving. The construction equipment, hours of operations, number of pieces of equipment operating at the same time, and construction phases, would vary depending on the specific project; therefore, the construction noise levels are also expected to vary. Each construction phase would use a combination of equipment and personnel that would vary throughout that phase. In addition, construction phases could overlap at the site. This would lead to a variety of possible construction activities and equipment that may occur at any given time throughout the construction process. Construction activities would generate noise from heavy construction equipment and construction-related traffic. A typical construction site would be expected to generate noise levels of about 85 dBA at 50 feet from the center of construction activity. Most of the construction noise sources would be located at or near ground level, which would help attenuate noise levels. The estimated noise from a representative construction site at increasing distances from the site is provided in Table 4.5-3.

TABLE 4.5-2

Example of Noise Levels from Construction Noise Sources

EQUIPMENT	TYPICAL NOISE LEVEL IN DECIBELS (dBA)[a]
Air Compressor	81
Backhoe	80
Compactor	82
Concrete Mixers	85
Concrete Pumps	82
Concrete Vibrator	76
Crane, Derrick	88
Crane, Mobile	83
Dozer	85
Generators	81
Grader	85
Jackhammers	88
Loader	85
Paver	89
Pile-driver (Impact)	101
Pile-driver (Sonic)	96
Pneumatic Tool	85
Pumps	76
Rock Drill	98
Roller	74
Saw	76
Scraper	89
Shovel	82
Truck	88

(a) FTA, 2006. Levels are in dBA at 50 feet from the source.

TABLE 4.5-3

Noise Level Attenuation at a Representative Construction Site

DISTANCE FROM CONSTRUCTION NOISE SOURCE (feet)	ESTIMATED NOISE LEVEL (dBA)
50	85
100	79
200	73
400	67
800	61
1,600	55
3,200	49
6,400	43

Table 4.5-3 assumes noise from construction activities of about 85 dBA at 50 feet from the center of construction activity and using an estimated six dBA reduction for every doubling of distance, the noise levels are expected to decrease to about 61 dBA at about 800 feet from construction activities. The potential noise impact of construction activities would vary depending on the existing noise levels in the environment and the location of sensitive receptors (e.g., residents, hotels, hospitals, etc.) with respect to construction activities. Because no specific projects are currently proposed, the noise impacts are speculative. Nonetheless, construction activities associated with control measures in the 2016 AQMP could occur throughout the Basin. The 2016 AQMP may require existing commercial or industrial owners/operators of affected facilities to install air pollution control equipment of modify their existing operations to reduce stationary source emissions. Potential modifications would occur at facilities typically located in appropriately zoned industrial or commercial areas. Installing air pollution control equipment could generate noise impacts, but virtually all of the control equipment would be installed within industrial and commercial facilities, so that construction noise impacts at stationary sources on sensitive receptors are expected to be less than significant.

The 2016 AQMP may also require construction of overhead catenary lines or other similar technologies along existing roadways and transportation corridors. Existing noise levels from the roadways and transportation corridors that could be impacted by these control measures (e.g., MOB-05, MOB-09, ORHD-05, ORHD-06, ORHD-08, and ORHD-09) are expected to be high as they are currently heavily traveled transportation corridors (e.g., Terminal Island Freeway and Alameda Corridor). The construction of catenary lines or similar technologies would result in additional noise sources (e.g., heavy construction equipment) near these transportation corridors. There are residential areas and other sensitive receptors near some of these transportation corridors that include: 1) the western portions of the City of Long Beach near and adjacent to the Terminal Island Freeway and near Sepulveda Boulevard; 2) residents in the City of Wilmington near Alameda Street; and 3) residents in the City of Carson and other cities and jurisdictions along Alameda Street. Some of these residents are located within several hundred feet of the existing roadways so noise levels associated with construction activities could be in the range of 65-75 dBA, which could result in noise increases of three dBA or greater and generate significant noise impacts.

Vibration associated with ground-borne sources is generally not a common environmental problem. However, construction activities such as blasting, pile driving, and heavy earthmoving equipment are potential sources of vibration during construction activities. As described for construction noise impacts, some residents are located within several hundred feet of the existing roadways and construction activities could result in noticeable vibration impacts. Project construction would involve equipment and activities that may have the potential to generate groundborne vibration. In general, demolition of structures during construction generates the highest levels of vibration. The Federal Transit Administration (FTA) has published standard vibration levels and peak particle velocities for construction equipment operations (FTA, 2006). The approximate velocity level and peak particle velocities for large construction equipment are listed in Table 4.5-4. Groundborne vibration is quantified in terms of decibels, since that scale compresses the range of numbers required to describe the oscillations. The FTA uses vibration decibels (abbreviated as VdB) to measure and assess vibration amplitude. In the United States, vibration is referenced to one micro-inch/sec (25.4 micro-mm/sec) and presented in units of VdB.

TABLE 4.5-4

Representative Construction Equipment Vibration Impacts

EQUIPMENT	APPROXIMATE PEAK PARTICILE VEOLCITY AT 25 FT. (INCHES/SECOND)(1)	APPROXIMATE VELOCITY LEVEL AT 25 FT. (VBD) (1)	APPROXIMATE VELOCITY LEVEL AT 200 FT. (VDB) (1)
Pile Driver (typical)	0.644	100	82
Vibratory Roller	0.210	94	76
Large Bulldozers	0.089	87	69
Loaded Trucks	0.076	86	68
Jackhammer	0.035	79	61
Small Bulldozer	0.003	58	40

(1) Source: FTA, 2006. Data reflects typical vibration levels

The FTA recommends using an estimated six VdB reduction for every doubling of distance (FTA, 2006). Using the FTA methodology, the VdB would range from 40 to 82 VdB within 200 feet from construction activities, depending on the type of equipment used. The predicted vibration during construction activities can be compared to the significance threshold of 72 VdB. Vibration from construction activities could exceed the 72 VdB threshold for structures and sensitive receptors within 200 feet of construction activities, if certain types of construction equipment are used. Therefore, vibration impacts associated with construction activities associated with control measures in the 2016 AQMP are considered significant.

Construction activities are often limited to daytime hours to prevent noise impacts during the more sensitive nighttime hours, but construction in commercial and industrial zones can occur during the evenings. However, for construction occurring in residential areas, construction companies would be required to follow the local city or county noise ordinance or guidelines in the Noise Element which are typically stricter when compared to construction noise occurring in commercial or industrial areas. For example, construction in residential areas may have a narrower range of hours and days when construction can occur. In some cities, enforcement of noise ordinances is assigned to the local police department.

However, transportation-related construction activities often occur during the evening/nighttime hours to minimize traffic impacts during the more heavy traffic periods. For example, construction activities related to catenary overhead lines may occur during the evening/nighttime hours to minimize traffic conflicts, as construction would be expected along existing roads and transportation corridors. Therefore, the noise and vibration impacts during construction activities are considered significant. Workers exposed to noise sources in excess of 90 dBA for an eight-hour period would be required to wear hearing protection devices that conform to Occupational Safety and Health Administration/National Institute for Occupational Safety and Health (NIOSH) standards.

4.5.4.2 Operational Activities

As discussed above, the 2016 AQMP may require existing commercial or industrial owners/operators of affected facilities to install air pollution control equipment of modify their existing operations to reduce stationary source emissions. Potential modifications would likely occur at facilities typically located in appropriately zoned industrial or commercial areas. Installing air pollution control equipment on stationary sources could generate noise and vibration impacts, but virtually all of the control equipment would be installed within industrial and commercial facilities. Further, noise requirements and noise ordinances of the city or county would continue to apply to stationary sources, so that noise impacts on sensitive receptors are expected to be less than significant. Wayside electrification/magnetizing could be installed as a result of implementing Control Measures MOB-05, MOB-09, ORHD-05, ORHD-06, ORHD-08, and ORHD-09. Installation of catenary lines/rail electrification would likely occur along existing transportation corridors and railways and is not expected to require constructing new roadways or corridors. It is not expected that trucks and locomotives using wayside sources of electricity would be louder than non-electrified mobile sources. Indeed, electric motors connected to wayside power would likely be quieter than diesel mobile sources because electric motors have fewer moving parts. Further, wayside power would likely be installed on major transportation corridors where noise levels are already high and, often, are the major noise sources in many areas, especially industrial areas and near the ports. Wayside power would be used to displace existing truck or rail traffic and would not be expected to generate additional traffic. Therefore, operational noise and vibration impacts associated with the 2016 AQMP are expected to be less than significant.

With control measures ECC-03, ECC-04, and CMB-02, once the solar panels, cool roof technology, and water heaters are installed, no operational noise or vibration impacts would be expected.

While nearly all noise impacts associated with the proposed control measures in the 2016 AQMP are associated with construction activities, BCM-03 could result in operational noise impacts due to an increase in street sweeping needed to reduce dust from paved road surfaces. BCM-03 could also result in additional wheel-washing systems to help prevent track out of dust onto paved roads. Street sweeping could be conducted by either manual sweeping which would not be a substantial source of noise or through the use of street sweepers which have noise levels ranging from 73 to 77 dBA at 75 feet, unless equipped with sound reduction technology. For example, TYMCO has street sweepers that are equipped with Sound Reduction Engineering and the noise levels generally range lower than typical street sweepers from 67 to about 71 dBA (Tymco, 2016).

Street sweepers generally travel at slow speeds, so to minimize traffic impacts, they are often used in the early morning or after peak hour traffic. The nominal operating speed for a street sweeper is about five miles per hour to ensure a thorough pickup of debris. In residential areas, street sweepers would likely be used during normal work hours as residential streets generally have less parking during these hours so the use of street sweepers on residential areas is generally conducted during the day time. Street sweeping in commercial and industrial areas is generally conducted during off-peak hours to avoid traffic conflicts. Control measure BCM-03 is not expected to require new street sweeping in areas where there is no current street sweeping program in place. Instead, in areas that street sweeping is currently conducted, the frequency when roads are swept may increase. The roads that are most likely to require additional sweeping are those located in industrial and commercial areas where sensitive receptors are typically not located. Therefore, because additional street sweeping is not expected to be required in residential or other noise-sensitive areas, additional street sweeping activities that may be required under Control Measure BCM-03 are not expected to result in significant noise impacts.

4.5.5 MITIGATION MEASURES

The operational noise and vibration impacts from implementation of the 2016 AQMP were concluded to be less than significant.

The impact of the proposed project on local noise levels and vibration during construction, although temporary in nature, are considered significant. Therefore, the following mitigation measures should be implemented:

NS-1 Install temporary noise barriers during construction.

NS-2 Use noise barriers to protect sensitive receptors from excessive noise levels during construction.

NS-3 Schedule construction activities consistent with the allowable hours pursuant to applicable general plan noise element or noise ordinance. Ensure noise-generating construction activities (including truck deliveries, pile driving, and blasting) are limited to the least noise-sensitive times of day (e.g., weekdays during the daytime hours) for projects near sensitive receptors. Where construction activities are authorized outside the limits established by the noise element of the general plan or noise ordinance, notify affected sensitive noise receptors and all parties who will experience noise levels in access of the allowable limits for the specified land use, of the level of exceedance and duration of exceedance; and provide a list of protective measures that can be undertaken by the individual, including temporary relocation or use of hearing protective devices.

NS-4 Limit speed and/or hours of operation of rail and transit systems during the selected periods of time to reduce duration and frequency of conflict with adopted limits on noise levels.

NS-5 Post procedures and phone numbers at the construction site for notifying the Lead Agency staff, local Police Department, and construction contractor (during regular construction hours and off-hours), along with permitted construction days and hours, complaint procedures, and who to notify in the event of a problem.

NS-6 Notify neighbors and occupants within 300 feet of the project construction area at least 30 days in advance of anticipated times when noise levels are expected to exceed limits established in the noise element of the general plan or noise ordinance.

NS-7 Hold a preconstruction meeting with the job inspectors and the general contractor/onsite project manager to confirm that noise measures and practices (including construction hours, neighborhood notification, posted signs, etc.) are completed.

NS-8 Designate an on-site construction complaint and enforcement manager for the project.

NS-9 Ensure that construction equipment are properly maintained per manufacturers' specifications and fitted with the best available noise suppression devices (e.g., mufflers, silencers, wraps). All intake and exhaust ports on power equipment shall be muffled or shielded.

NS-10 Ensure that impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for project construction are hydraulically or electrically powered to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust can and should be used. External jackets on the tools themselves can and should be used, if such jackets are commercially available and this could achieve a reduction of 5 dBA. Quieter procedures can and should be used, such as drills rather than impact equipment, whenever such procedures are available and consistent with construction procedures.

NS-11 Ensure that construction equipment is not idling for an extended time in the vicinity of noise-sensitive receptors.

NS-12 Locate fixed/stationary equipment (such as generators, compressors, rock crushers, and cement mixers) as far as possible from noise-sensitive receptors.

NS-13 Consider using flashing lights instead of audible back-up alarms on mobile equipment.

NS-14 For projects that require pile driving or other construction techniques that result in excessive vibration, such as blasting, determine the potential vibration impacts to the structural integrity of the adjacent buildings within 50 feet of pile driving locations.

NS-15 For projects that require pile driving or other construction techniques that result in excessive vibration, such as blasting, determine the threshold levels of vibration and cracking that could damage adjacent historic or other structure, and design means and construction methods to not exceed the thresholds.

NS-16 For projects where pile driving would be necessary for construction due to geological conditions, utilize quiet pile driving techniques such as predrilling the piles to the maximum feasible depth, where feasible. Predrilling pile holes will reduce the number of blows required to completely seat the pile and will concentrate the pile driving activity closer to the ground where pile driving noise can be shielded more effectively by a noise barrier/curtain.

NS-17 For projects where pile driving would be necessary for construction due to geological conditions, utilize quiet pile driving techniques such as the use of more than one pile driver to shorten the total pile driving duration.

4.5.6 IMPACTS AFTER MITIGATION

While mitigation measures NS-1 to NS-17 would minimize some of the noise and vibration impacts from construction, the SCAQMD cannot predict how a lead agency or responsible agency might choose to mitigate a significant construction noise and vibration impacts for a future project. Therefore, noise and vibration impacts from construction of implementing the 2016 AQMP are expected to remain significant.

4.6 SOLID AND HAZARDOUS WASTE

4.6.1 INTRODUCTION

This subchapter examines solid and hazardous waste impacts associated with implementing the proposed control measures in the 2016 AQMP. All control measures in the 2016 AQMP were evaluated to determine whether they could generate direct or indirect solid and hazardous waste impacts based on the anticipated methods of control.

The NOP/IS for the 2016 AQMP identified the following types of control measures as having potentially significant solid and hazardous waste impacts due to potential increases in waste from: 1) construction; 2) the disposal of old equipment; 3) spent catalysts; 4) street sweeping activities; 5) spent filters and baghouses; 6) limitations on waste burning; and, 7) vehicle/equipment scrapping and car battery disposal.

4.6.2 2016 AQMP CONTROL MEASURES WITH POTENTIAL SOLID AND HAZARDOUS WASTE IMPACTS

The solid and hazardous waste analysis in this Program EIR identifies the potential solid and hazardous waste impacts from implementing the 2016 AQMP. All control measures were analyzed to identify the potential solid and hazardous waste impacts.

The 2016 AQMP continues the air quality management strategy of advancing clean technologies and promoting their use. Implementing some of the 2016 AQMP control measures could result in solid and hazardous waste impacts in the region. The solid and hazardous waste analysis in this Program EIR identifies the potential solid and hazardous waste impacts from implementing the 2016 AQMP. Each control measure proposed in the 2016 AQMP was evaluated and 59 control measures were identified as having potential adverse solid and hazardous waste impacts. In particular, some control measures in the 2016 AQMP incentivize the upgrading or replacement of existing equipment with zero or near-zero emissions equipment/technology, while other control measures encourage the use of air pollution control technologies which could increase the amount of solid and hazardous waste. Table 4.6-1 contains a summary of the 2016 AQMP control measures which may result in the use of compliance options that could generate significant solid and hazardous waste impacts.

TABLE 4.6-1

Control Measures with Potential Solid and Hazardous Waste Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WASTE IMPACTS
ECC-03	Additional Enhancement in Building Energy Efficiency and Smart Grid Technology (NOx, VOC)	Measure consists of incentives and promoting existing energy efficiency programs that would reduce criteria and GHG emissions.	Generation of waste from construction activities and disposal of old equipment.
CMB-01	Transition to Zero and Near-Zero Emission Technologies for Stationary Sources (NOx, VOC)	Incentivize transition to zero and near-zero emission technologies, specifically those in non-power plant combustion sources	Generation of waste from disposal of old equipment.
CMB-02	Emission Reductions from Commercial and Residential Space and Water Heating	Implement regulations on commercial and residential heaters/burners and incentivize replacement of old heaters with new.	Generation of solid waste from disposal of old heaters/burners.
CMB-03	Emission Reductions from Non-Refinery Flares (NOx)	Installation of newer flares implementing the best available control technology.	Generation of solid waste from disposal of old flares.
CMB-04	Emission Reductions from Restaurant Burners and Residential Cooking	Incentivize the installation of low-NOx burner technologies.	Generation of solid waste from disposal of old burners.
CMB-05	Further NOx Reductions from RECLAIM Assessment (NOx)	Re-examination of the RECLAIM program, including voluntary opt-out and the implementation of additional control equipment and SCR equipment	Generation of waste from construction activities, generation of solid waste from disposal of old equipment, and use of additional catalysts.
FLX-02	Stationary Source VOC Incentives (VOC)	Use of replacement coatings, such as UV cured resins and coatings, super-compliant/ultra-low emission technologies and electrification in the place of combustion based equipment.	Generation of solid waste from disposal of old equipment.
BCM-01	Further Emissions Reductions from Commercial Cooking (PM)	Installation of control equipment such as ESPs, filters, centrifugal separators, and misters.	Generation of solid waste from disposal of old equipment.
BCM-02	Emission Reductions from Cooling Towers (PM)	Installation of drift elimination technologies into cooling towers.	Generation of solid waste from disposal of old equipment.
BCM-03	Further Emission Reductions from Paved Road Dust Sources	Reduction of track out from stationary sources by specifying street sweeping methods and frequency.	Generation of waste from additional street sweeping activities.
BCM-04	Emission Reductions from Manure Management Strategies (NH3)	Acidifier application, manure removal, manure slurry injection, and dietary manipulation and feed additives to reduce ammonia in manure	Generation of additional waste matter from use of acidifiers and removal of manure.

TABLE 4.6-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WASTE IMPACTS
BCM-05	Ammonia Emission Reduction from NOx Controls (NH3)	Installation and use of advanced catalyst technology for the conversion of ammonia	Generation of waste from installing and maintaining new catalyst technologies and disposal of any replaced machinery.
BCM-06	Emission Reductions from Abrasive Blasting Operations (PM)	Construction of exhaust ventilation to a fabric filter for permanent in building abrasive blasting activities and the use of additional portable equipment like negative air machines, fume extractors, and dust collectors with HEPA filters.	Generation of waste from portable control equipment such as dust collectors.
BCM-07	Emission Reductions from Stone Grinding, Cutting, and Polishing Operations (PM)	Installation of engineering controls, such as exhaust ventilation with dust collectors, the use of wet methods like wet-wiping or wet sweeping, and vacuuming with a HEPA filter.	Generation of waste from dust collection measures.
BCM-08	Further Emission Reductions from Agricultural, Prescribed, and Training Burning (PM)	Incentivize chipping/grinding or composting in the place of agricultural burning as well as the increased utilization of clean fuels for training burns.	Generation of additional waste due to limitations on burning.
BCM-09	Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves (PM)	Incentivize upgrading of wood burning hearths to cleaner hearth as well as an increase in the stringency of the curtailment program and education.	Generation of waste from disposal of old hearths and additional limitations on wood burning.
BCM-10	Emission Reductions from Greenwaste Composting (NH3, VOC)	Use of controls such as anaerobic digestion and organic processing technology and restrictions for direct applications of uncomposted greenwaste onto public lands.	Generation of additional waste due to restrictions on application of uncomposted greenwaste.
MOB-01	Emission Reductions at Commercial Marine Ports (NOx, SOx, PM)	Financial incentives for cleaner vessels, vehicles, and use of alternative fuels or fuel additives at marine ports.	Generation of waste from battery disposal and turnover of older equipment.
MOB-02	Emission Reductions at Rail Yards and Intermodal Facilities (NOx, PM)	Acceleration of the penetration of zero and near-zero emission locomotives and the use of alternative fuels and fuel additives.	Generation of waste from battery disposal and turnover of older equipment.
MOB-03	Emission Reductions at Warehouse Distribution Centers (all pollutants)	Use of incentives, regulatory rules, and promotion of hybrid technologies to increase zero and near-zero emission equipment in/around warehouse.	Generation of waste from disposal of older equipment.

TABLE 4.6-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WASTE IMPACTS
MOB-04	Emission Reductions at Commercial Airports (all pollutants)	Incentivize zero and near-zero technologies like alternative fuels, diesel PM filters, and low-emitting engines.	Generation of waste from battery disposal and disposal of outdated equipment.
MOB-05	Accelerated Penetration of Partial-Zero and Zero Emissions Vehicles (VOC, NOx, CO)	Incentivize the "Clean Vehicle Rebate Project" to promote use of vehicles with zero and near-zero emissions.	Generation of waste from disposal of batteries and vehicle scrapping.
MOB-06	Accelerated Retirement of Older Light-Duty and Medium-Duty Vehicles	Incentivize the retirement of older vehicles that do not meet current emission standards.	Generation of wastes from disposal of batteries and vehicle scrapping.
MOB-07	Accelerated Penetration of Partial-Zero and Zero Emission Light-Heavy and Medium-Heavy Duty Vehicles (NOx, PM)	Early introduction of zero and near-zero emission vehicles such as hybrids and electric operated vehicles.	Generation of wastes from disposal of batteries and vehicle scrapping.
MOB-08	Accelerated Retirement of Older On-Road Heavy Duty Vehicles	Replace older heavy-duty vehicles with new vehicles that meet CARB standards.	Generation of wastes from disposal of batteries and heavy-duty vehicle scrapping.
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program (NOx, PM)	Incentivize the use of zero emission technologies, including the building of electric or magnetic power into roadway infrastructure.	Generation of waste from disposal of batteries and vehicle scrapping.
MOB-10	Extension of the SOON Provision for Construction/Industrial Equipment (NOx)	Incentivize the SOON program and phase in vehicles that meet Tier 4 standards in place of older, high emitting equipment.	Generation of waste from disposal of batteries and vehicle scrapping.
MOB-11	Extended Exchange Program	Incentivize retirement of older off-road engines to be replaced with newer models.	Generation of waste from disposal of outdated equipment.
MOB-12	Further Emission Reductions from Passenger Locomotives	Incentivize replacement of Tier 0 locomotives with Tier 4 locomotives.	Generation of waste from disposal of outdated equipment.
MOB-13	Off-Road Mobile Source Emission Reduction Credit Generation Program (NOx, SOx, PM)	Accelerate the penetration of zero and near-zero off-road mobile sources as well as the use of alternative fuels and fuel additives	Generation of waste from disposal of batteries or scrapping of older equipment.
MOB-14	Emissions Reductions from Incentives Programs (NOx, SOx, PM)	Implementation of the Carl Moyer Program to accelerate the penetration of clean air vehicles.	Generation of waste from disposal of batteries and vehicle scrapping.

TABLE 4.6-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WASTE IMPACTS
EGM-01	Emission Reductions from New Development or Redevelopment Projects (all pollutants)	Accelerate the penetration of zero and near-zero emission technologies in new or redevelopment projects, and the use of dust control, alternative fuels, diesel PM filter, low-emitting engines, low VOC materials and mitigation fees.	Generation of waste from disposal of outdated equipment and associated dust control methods.
TXM-01	Control of Metal Particulate from Metal Grinding Operations (TACs, PM)	Construction of enclosures and control equipment such as exhaust ventilation with dust collectors, use of wet methods like wet-wiping or wet sweeping to prevent dust release and other measures like vacuuming with a HEPA filter.	Generation of waste from dust control methods like wet-wiping and vacuuming with HEPA filters.
TXM-02	Control of Toxic Metal Particulate Emissions from Plating and Anodizing Operations (TACs, PM)	Modification of existing equipment, construction of enclosures and control equipment, such as exhaust ventilation with dust collectors, and the implementation of new measures like vacuuming with a HEPA filter and wet-wiping to prevent dust emission.	Generation of waste from dust control methods like wet-wiping and vacuuming with HEPA filters.
TXM-03	Control of Hexavalent Chromium from Chrome Spraying Operations (TACs, PM)	Improved inspection and housekeeping and use of best management practices at chromium spraying operations.	Generation of waste from housekeeping activities.
TXM-04	Control of Toxic Metal Particulate Emissions from Contaminated Soil (TACs, PM)	Construction and operation of enclosures and control equipment, such as HEPA filters, and wet methods to prevent dust release.	Generation of waste from dust control methods like wet-wiping.
TXM-05	Control of Toxic Metal Particulate Emissions from Laser Plasma Cutting (TACs, PM)	Construction of enclosures and control equipment, such as HEPA filters.	Generation of waste from dust control methods like use of HEPA filters.
TXM-06	Control of Toxic Emissions from Metal Melting Facilities (TACs, PM)	Construction of enclosures and control equipment, such as exhaust ventilation with filters/baghouses, and the implementation of methods to prevent dust release including wet-wiping and vacuuming with HEPA filters.	Generation of waste from dust control methods like wet-wiping and vacuuming with HEPA filters.

TABLE 4.6-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WASTE IMPACTS
TXM-07	Control of Lead Emissions from Stationary Sources (TACs, PM)	Construction and implementation of control equipment to minimize lead emissions as well as the use of best management practices.	Generation of waste from housekeeping activities.
TXM-08	Control of Emissions from Chemical Stripping of Cured Coatings (Methylene Chloride)	Reformulation of solvents and use of activated carbon.	Generation of solid waste from use of activated carbon.
TXM-09	Control of Toxic Emissions from Oil and Gas Well Activities (TACs, PM)	Construction of enclosures and control equipment and implementation of method to prevent dust release such as wet-wiping and vacuuming with a HEPA filter.	Generation of waste from dust control methods like wet-wiping and vacuuming with HEPA filters.
ORLD-01	Advanced Clean Cars 2 (NOx, ROG)	Expanded/new standards for clean cars to increase zero and near-zero emission vehicles which could include the use of alternative fuels.	Generation of wastes from disposal of batteries and vehicle scrapping.
ORLD-03	Further Deployment of Cleaner Technology: On-Road Light-Duty Vehicles (NOx, ROG)	Accelerate the penetration of zero and near-zero emission vehicles, including those vehicles that use alternative fuels and fuel additives.	Generation of wastes from disposal of batteries and vehicle scrapping.
ORHD-02	Low-NOx Engine Standards (NOx	Implementation of technologies to reduce emissions from heavy duty engines including the use of alternative fuels and fuel additives.	Generation of wastes from vehicle scrapping.
ORHD-04	Advanced Clean Transit (NOx, ROG)	Implementation of technologies to accelerate the penetration of zero and near-zero emission buses into the fleet, including the use of alternative fuels.	Generation of wastes from disposal of batteries and bus scrapping.
ORHD-05	Last Mile Delivery (NOx, ROG)	Accelerate the penetration of zero and near-zero emission last mile delivery trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Generation of wastes from disposal of batteries and truck scrapping.
ORHD-06	Innovate Technology Certification Flexibility (NOx)	Accelerate the penetration of zero and near-zero emission last mile delivery trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Generation of wastes from disposal of batteries and truck scrapping.

TABLE 4.6-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WASTE IMPACTS
ORHD-07	Zero Emission Airport Shuttle Buses (NOx, ROG, PM2.5)	Implementation of technologies to accelerate the penetration of zero and near-zero emission airport shuttles, including the use of alternative fuels.	Generation of wastes from disposal of batteries and scrapping of old buses.
ORHD-08	Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Accelerate the penetration of zero and near-zero emission heavy duty vehicle engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Generation of wastes from disposal of batteries and scrapping of old equipment.
ORHD-09	Further Development of Cleaner Technology: On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Accelerate the penetration of zero and near-zero emission engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Generation of wastes from disposal of batteries and scrapping of old equipment.
ORFIS-01	More Stringent National Locomotive Standards (NOx, ROG)	Use of Tier 5 Control equipment such as SCRs, alternative fuels, DPM filters and electric batteries.	Generation of waste from catalysts, DPM filters, electric batteries, and scrapping of old equipment.
ORFIS-03	Incentivize Low Emission Efficient Ship Visits (NOx, PM)	Incentives for the use of control equipment such as SCRs.	Generation of waste associated with disposal of catalysts while ships are in port.
ORFIS-04	At-Berth Regulation Amendments (NOx, ROG)	Further reduce emissions from ships at berth and advance the use of near-zero and zero emission technologies	Generation of waste associated with disposal of catalysts while ships are in port.
ORFIS-05	Further Development of Cleaner Technology: Off-Road Federal and International Sources (NOx, ROG)	Accelerate deployment of cleaner marine, rail and aircraft off-road technology by increasing incentive program.	Generation of waste associated with battery disposal and scrapping of old equipment.
OFFS-01	Zero-Emission Off-Road Forklift Regulation Phase 1 (NOx, ROG)	Accelerate the penetration of zero emission technologies to be used in off road forklifts.	Generation of wastes from disposal of batteries and scrapping of old equipment.
OFFS-04	Zero-Emission Airport Ground Support Equipment (NOx, ROG, PM2.5)	Accelerate the penetration of zero emission technologies to be used in airport ground support equipment.	Generation of wastes from disposal of batteries and scrapping of old equipment.
OFFS-05	Small Off-Road Engines (NOx, ROG)	Accelerate the penetration of zero emission technologies to be used in small off-road engines.	Generation of wastes from disposal of batteries and scrapping of old equipment.

TABLE 4.6-1 (concluded)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	WASTE IMPACTS
OFFS-07	Low Emission Diesel Requirement (NOx, PM)	Reformulation of diesel fuel to lower emissions.	Increased waste associated with catalyst use.
OFFS-08	Further Deployment of Cleaner Technologies: Off-Road Equipment(NOx, ROG, PM2.5)	Accelerate the implementation of zero emission technologies in off-road equipment.	Generation of waste associated with battery disposal.

4.6.3 SIGNIFICANCE CRITERIA

The NOP/IS (Appendix A) concluded that the 2016 AMQP would comply with federal, state, and local statutes and regulations related to solid and hazardous waste. However, implementation of the 2016 AQMP would be considered to have significant solid and hazardous waste impacts if the following condition occurs:

- The generation and disposal of hazardous and non-hazardous waste exceeds the capacity of designated landfills.

4.6.4 IMPACT ANALYSIS

4.6.4.1 Spent Batteries from Electric Vehicles

Control measures that encourage early retirement of older vehicles and other mobile sources and replacement with newer equipment or newer vehicles (including electric or hybrid vehicles) could result in an increase in waste generated from batteries including control measures MOB-01, MOB-02, MOB-03, MOB-04, MOB-05, MOB-06, MOB-07, MOB-08, MOB-09, MOB-10, MOB-11, MOB-12, MOB-13, MOB-14, ORLD-01, ORLD-03, ORHD-04, ORHD-05, ORHD-06, ORHD-07, ORHD-08, ORHD-09, ORFIR-05, ORFFS-01, OFFS-04, OFFS-05, and OFFS-08. The most common battery currently used in gasoline and diesel powered vehicles within the Basin is the lead-acid battery found in conventional automobiles and trucks. These batteries are disposed of and processed by the lead recycling industry such as Quemetco which is located in southern California. Zero and near-zero emission vehicles operate with different battery types than the lead-acid battery. The common battery types available for hybrid and electric powered vehicles are comprised of nickel metal hydride (NiMH) and lithium ion (Li-ion).

The 2016 AQMP control measures would incentivize the penetration of fuel cell, electric, and electric hybrid vehicles as part of mobile source pollution control measures. The suggested control measures that have additional requirements for zero and partial-zero emission vehicles are shown in Table 4.6-2. The batteries that power these types of vehicles have useful lives similar to or less than the life of a vehicle. Since some batteries contain toxic materials, the increased use of batteries may result in an incremental increase in solid and hazardous waste impacts. In addition, environmental impacts could occur if batteries were disposed of in an unsafe manner, such as illegal dumping or by disposal in an unlined landfill.

TABLE 4.6-2

Control Measures and Potential Vehicle Retirement Quantities

CONTROL MEASURE NO.	CONTROL MEASURE DESCRIPTION	ESTIMATED NUMBER OF VEHICLES	
		2023	2031
MOB-05, MOB-14, ONLD-01, and ORLD-03	Accelerated Penetration of Partial-Zero and Zero Emission Vehicles	357,000	714,000
ORHD-04	Advanced Clean Transit, Accelerated Penetration of Partial-Zero and Zero Emission Buses	11,000	11,000
MOB-06, MOB-07, MOB-08, ORHD-03, ORHD-04, ORHD-05, ORHD-06, ORHD-08	Accelerated Penetration of Partial-zero and Zero Emissions Light, Medium and Heavy-Duty Trucks	115,000	245,000
MOB-01, MOB-02, MOB-03, MOB-04, OFFS-01, OFFS-04, OFFS-06	Accelerate the Penetration of Zero Emission TRUs, Forklifts and Ground Support Equipment	50,000	100,00
OFFS-02, OFFS-08	Further Deployment of Cleaner Technologies for Larger Off-Road Diesel/Gasoline Equipment	30,000	60,000
MOB-10, OFFS-03, OFFS-08	Penetration of Zero Emission Off-Road Construction and Industrial Equipment	20,000	40,000

The 2016 AQMP control measures would also incentivize the penetration of fuel cell, electric, and electric hybrid vehicles as part of mobile source pollution control measures, which is expected to reduce the use of conventional vehicles within California and the Basin. Conventional vehicles use lead acid batteries; therefore, a reduction in the use of conventional vehicles would lead to a reduction in the use of lead-acid batteries. Lead-acid batteries have a three to five year life, which is much less than the life of the vehicle so that the batteries need to be periodically replaced. Electric vehicles and hybrid batteries last much longer than lead-acid batteries. For example, most of the batteries in electric vehicles have warranties for 10 years or 150,000 miles. However, Toyota has reported that its battery packs have lasted for more than 180,000 miles in testing. Further, a large number of Ford Escape Hybrid and Toyota Prius taxicabs in New York and San Francisco have logged over 200,000 miles on their original battery packs (Edmunds, 2014). Therefore, because electric and hybrid batteries tend to last substantially longer than lead-acid batteries in conventional vehicles, an increase in the use of electric/hybrid vehicles would result in a decrease in the amount of spent lead-acid batteries that require recycling.

Batteries in hybrid vehicles are much larger than batteries in conventional vehicles. The current hybrid batteries weigh about 110 pounds and are composed of NiMH batteries which are charged by an internal combustion engine driven generator and/or by a regenerative braking system that captures power from deceleration and braking.

The recycling of hybrid battery packs is still in its infancy as there have not been many battery packs surrendered for recycling. The NiMH batteries found in hybrid vehicles are basically "zero-landfill" products, meaning that whatever cannot be recycled is typically consumed in the recycling process. The primary metals recovered during recycling are nickel, copper, and iron. Some principal rare earth metals, neodymium and lanthanum, are also recovered (Edmunds, 2014). Improper disposal of NiMH batteries poses less of an environmental hazard than that of lead-acid or nickel-cadmium batteries because NiMH batteries do not contain lead and cadmium which are toxic. Most industrial nickel is recycled, due to the relatively easy retrieval of the magnetic element from scrap using electromagnets, and due to its high value.

Because Li-ion batteries have a potential for after-automotive use, destructive recycling can be postponed for years even after an EV or hybrid battery can no longer hold and discharge sufficient electricity to power a car's motor. The battery pack can still carry a tremendous amount of energy. Battery manufacturers have projected that Li-ion battery packs will still be able to operate at about 80 percent of capacity at the time they must be retired from automotive use (Edmunds, 2014). For example, several major power utilities are working with companies such as General Motors, Ford, Toyota, and Nissan to explore the use of Li-ion batteries for the stationary storage of power produced during off-peak periods by wind turbines and solar generation stations. The Li-ion battery packs are also being tested as backup power storage systems for retail centers, restaurants, and hospitals, as well as residential solar systems (Edmunds, 2014). Auto companies are partnering with battery, recycling, and electronics firms to figure out and develop post-automotive markets and applications for Li-ion battery packs (Green Car Reports, 2016). With the opportunity for other non-automotive aftermarket uses, Li-ion battery recycling may not be immediately necessary when compared to recycling of lead-acid batteries.

Most battery and fuel cell technologies, including NiMH and Li-ion batteries, generally contain materials that have high economic value and, therefore, are recyclable. Further, some manufacturers offer incentives to prevent the illegal disposal of the batteries. For example, most car manufacturers offer a program to take back used or damaged battery packs, including Toyota and Nissan (Green Car Reports, 2016). Once the packs are at the proper distribution point, the recyclers break down their constituent parts to salvage any wiring, electrical components and plastics that can be separately recycled. A high temperature process is used to separate the battery content into metal alloys and slag that concentrates the rare earth elements that the batteries contain (Edmunds, 2014).

Additionally, both regulatory requirements and market forces require or encourage recycling. The following is a brief listing of some of the more important Federal and California regulations that have created requirements or incentives for the proper disposal and recycling of EV battery packs:

- The federal Battery Act promulgated in 1996 requires that each regulated battery be labeled with a recycling symbol. NiCad batteries must be labeled with the words “NiCad” and the phrase “Battery must be recycled or disposed of properly.” Lead-acid batteries must be labeled with the words “Lead,” “Return,” and “Recycle.”

- Current California and federal regulations require ZEV manufacturers to take into account the complete life-cycle of car batteries and to plan for safe disposal and/or recycling of battery materials.

- The California Health and Safety Code does not allow the disposal of lead-acid batteries at a solid waste facility or on or in any land, surface waters, water courses, or marine waters. Legal disposal methods for used lead-acid batteries are to recycle/reuse the battery or to dispose of it at a hazardous waste disposal facility. A lead-acid battery dealer is required to accept spent batteries when a new one is purchased.

- California Public Resources Code requires state agencies to purchase car batteries made from recycled material.

- The Universal Waste Rule requires that spent batteries exhibiting hazardous waste characteristics and are not recycled need to be managed as hazardous waste. This includes lead-acid and NiCad batteries.

- Car manufacturers offer incentives to recycle batteries, e.g., Toyota offers $200 for spent battery packs to help promote battery recycling.

Because Li-ion batteries are composed of relatively inexpensive materials, recycling this type of batteries may not be profitable. However, recycling of these batteries may still be preferred over disposal because recycling supports a closed-loop supply chain and is consistent with the principles of environmentalism and sustainability. A closed-loop supply chain is attractive because it protects manufacturers from volatility in the lithium market since approximately 70 percent of the global lithium deposits are concentrated in and supplied by South America (MNTRC, 2014).

Only two recycling firm, Umicore and Retriev Technologies (previously known as Toxco), have the technology to recycle both NiMH and Li-ion batteries. Umicore, while based in Belgium as the leading metals recycling company in Europe, is expanding their operations in the United States. Retriev Technologies is the only company in North America with the capacity to recycle Li-ion batteries. Retriev Technologies was awarded a federal grant to build and operate an advanced lithium battery recycling facility at their existing Lancaster, Ohio site (Edmunds, 2014).

The Retriev Technologies facility appears to be the recycler that is most widely used by companies that sell hybrids and EVs in North America when batteries reach their end of life. The facility uses a proprietary system to primarily recycle Ni-MH batteries. Retriev Technologies also currently handles small volumes of Li-ion battery packs as it works with automakers to develop the best recycling processes.

Recycling of lead-acid and nickel-cadmium batteries is also a well-established activity. Eighty percent of lead consumed in the United States is used to produce lead-acid batteries and the lead recovery rate from batteries is approximately 80 to 90 percent. According to the Lead-Acid Battery Consortium, 95 to 98 percent of all battery lead is recycled.

Because most EV batteries are recycled, it is unlikely that the increase in battery use would significantly adversely affect landfill capacity in California. As mentioned earlier, electric batteries generally hold significant residual value, and 95 to 98 percent of all lead-acid batteries are recycled. In addition, the electric batteries that would power EVs are packaged in battery packs and cannot be as easily disposed of as a single 12-volt conventional vehicle battery, which some electric cars also have. It should be noted that the increased operation of EVs associated with the implementation of the 2016 AQMP may actually result in a reduction of the amount of solid and hazardous waste generated within SCAQMD's jurisdiction, as NiMH and Li-ion in batteries have a much longer life span than conventional lead-acid batteries. Further, their larger size and heavy weight (over 100 pounds) makes them more difficult to handle and transport for unauthorized disposal. Additionally, the advanced-technology automotive battery recycling industry is setting up operations where processing will have no impact on landfills either locally or within the state.

EVs do not require the various oil and gasoline filters that are required by vehicles using internal combustion engines. Furthermore, EVs do not require the same type or amount of engine fluids (oil, antifreeze, etc.) that are required by vehicles using internal combustion engines. Specifically, approximately 282,900 tons per year of waste oil was generated in the Basin in 2014 (see Chapter 3.7, Solid/Hazardous Waste, Table 3.7-10). Because of the widespread use and volume of waste oil, a portion of waste oil is illegally disposed of via sewers, in waterways, on land, and disposed in landfills. Waste oil that is illegally disposed can contaminate the environment (via water, land, or air). In addition, a substantial amount of motor oil leaks from vehicles driving on roadways and this motor oil is eventually washed into storm drains which empty into the ocean.

Since electric motors do not require motor oil as a lubricant, replacing internal combustion engines with electric engines will eliminate the impacts of motor oil use and disposal. For example, a 50 percent penetration of light-duty electric vehicles will result in a corresponding 50 percent reduction in the release of motor oil into the environment due to illegal disposal and a 50 percent reduction in the generation of waste oil. Release of contaminants due to engine oil that burns up in or leaks from engines, or due to the burning of recovered engine oil for energy generation will also be reduced. Additional use of electric vehicles is expected to have a beneficial environmental impact by reducing the amount of motor oil used, recycled, potentially illegally disposed, or washed into storm drains and ending up in the ocean.

Illegal or improper disposal of batteries from EVs and hybrids could result in significant solid waste impacts if hazardous wastes are disposed of in municipal landfill. However, because battery recycling is required by law and because they have value, the illegal or improper disposal of batteries is expected to be uncommon. For example, because some manufacturers pay for used EV/hybrid batteries, the value, size, and length of life of NiMH and Li-ion batteries are such that recycling is expected to be more predominate than with lead acid batteries. Therefore, the use of EVs and hybrids are not expected to result in an increase in the illegal or improper disposal of batteries because these types of batteries are required to be recycled.

4.6.4.2 Air Pollution Control Technologies

4.6.4.2.1 Carbon Adsorption

Table 4.6-1 identifies those proposed control measures, including control measure TXM-08, that may have potential solid waste impacts due to the use of air pollution control equipment that utilizes carbon adsorption technology. Carbon adsorption eventually requires the disposal and replacement of the spent carbon. It is difficult to quantify the number of facilities that would employ this type of technology, the rate of disposal necessary to maintain the equipment, the type of waste generated by the equipment (i.e., hazardous or non-hazardous), and the timing by which these technologies would come into use. However, known uses of carbon adsorption technology have been examined qualitatively in the following paragraphs.

Carbon adsorption is used to control VOC emissions primarily from stationary sources. The amount of solid waste which may be generated by the carbon adsorption process would depend on the number of carbon absorbers installed, the operating characteristics including the components in the exhaust stream, and the frequency of carbon replacement. Most of the control measures have alternative methods for preventing VOC emissions, such as reformulating materials.

However, if carbon adsorption systems are used, the amount of hazardous waste generated on an annual basis is expected to be minimal because most of activated or fresh carbon, after it becomes spent and no longer effective, is reclaimed and reactivated, resulting in negligible impacts on solid waste disposal facilities. Activated carbon can have a useful lifetime of five to 10 years; however, the operating characteristics of the control device and the chemistry of the waste stream may result in a shorter lifetime.

Spent carbon is usually recycled and reused rather than disposed in landfills. Most facilities contract out with vendors that take the spent carbon and deliver a fresh supply of activated carbon. Another alternative to disposing spent carbon is to burn it in a thermal incinerator. With thermal incineration, any organic materials contained in the carbon are oxidized to form carbon dioxide, water, and in most cases, harmless combustion by-products. Thermal incineration occurs at high temperatures and tends to destroy any toxic components while substantially reducing the volume of spent carbon to be disposed of, whereby reducing solid waste impacts. The disadvantage of employing thermal incineration is that it generates combustion by-products which may cause an increase in criteria pollutant emissions.

Further, it is not expected that carbon adsorption will be used in a majority of the cases because of the expense involved as a control option, especially when there are other more cost-effective options available that can better handle large exhaust streams. However, carbon adsorption may be cost-effective for use in smaller operations. Thus, facility operators will likely choose other more cost-effective options, such as using reformulated products, in lieu of installing control equipment, to comply with the control measures.

4.6.4.2.2 Particulate Traps, Filters, and Precipitators

A number of control measures in the 2016 AQMP could require the collection and disposal of additional particulate matter including BCM-01, BCM-03, BCM-04, BCM-06, BCM-07, EGM-01, TXM-01, TXM-02, TXM-03, TXM-03, TXM-04, TXM-05, TXM-06, TXM-07, TXM-08, TXM-09, ORFIS-01, ORFIS-03, ORFIS-04, and OFFS-07. These measures could result in increased collection of particulate matter that would then need to be disposed.

While it is speculative to identify the number of facilities and the quantity of equipment that would utilize filters, particulate traps, and precipitators, the quantity of particulate matter collected on filters and from electrostatic precipitators is expected to be small. Baghouses, pre-filters, filters, electrostatic precipitators, and HEPA filters collect particulate emissions from stationary and mobile sources of particulate emissions. These types of filtration control equipment can effectively remove particulate matter, including heavy metals, asbestos, as well as other toxic and nontoxic compounds. Polytetrafluoroethylene (PTFE) membranes or HEPA filters can increase a system's removal efficiency up to 99.9 percent. In general, as particulate size decreases, the surface area-to-volume ratio increases, thus, increasing the capacity of these filters to catch smaller particles (including hazardous materials). An increase in the use of membranes and filters may result in an incremental increase in solid waste requiring disposal in landfills over what would be produced if the 2016 AQMP were not adopted. In some cases, waste generated will be hazardous (e.g., the collection of toxic emissions). The increase in the amount of waste generated from the use of filters and the collection of additional particulate matter are expected to be small, because filtration control equipment is already used in practice or required by existing rules, especially for stationary sources. Control measures that may include filtration control equipment will generally require increased control efficiencies and/or better housekeeping and maintenance requirements for the filtration devices. As a result the incremental amount of material collected by filters is expected to be small. Further, the larger filters used in baghouses are cleaned and reused so minimal additional waste would be expected from filters themselves.

The collected waste from filters, baghouses, and ESPs are considered solid waste (i.e., not hazardous) which can be disposed of at a number of landfills in southern California. The permitted capacity of the landfills in Los Angeles, Orange, Riverside, and San Bernardino counties is about 112,592 tons per day (see Table 3.7-2) and have sufficient capacity to handle the small increase in waste.

There are no hazardous waste landfills within the Southern California area. Hazardous waste can be transported to permitted facilities both within and outside of California. Hazardous waste is expected to be transported to Clean Harbors in Buttonwillow, California. The permitted capacity at the Buttonwillow landfill is in excess of 10 million cubic yards so it would have sufficient capacity to handle any small amounts of hazardous waste that could be collected by the filters, baghouses, or ESPs (Clean Harbors, 2015). The nearest out-of-state hazardous waste landfills are U.S. Ecology, Inc., located in Beatty, Nevada and Clean Harbors in Grassy Mountain, Utah. U.S. Ecology, Inc. is currently receiving waste and is in the process of extending the operational capacity for an additional 35 years (U.S. Ecology, 2015). Clean Harbors is currently receiving waste and expected to continue to receive waste for an additional 70 years (Clean Harbors, 2015).

4.6.4.2.3 Selective Catalytic Reduction

The 2016 AQMP could result in the increased use of SCR units to control emissions. The following control measures could rely on SCR technology for emission control including BCM-05, ORFIS-01, ORFIS-03, ORFIS-04, and OFFS-07. The catalyst in SCR beds generally uses various ceramic materials comprised of precious metals to aid in the capture and conversion of NOx into N_2 and water in an exhaust stream. SCRs require periodic regeneration or replacement of the catalyst bed. Regeneration of catalyst is preferred, due to the high cost to purchase new catalyst; however, if the catalyst cannot be regenerated, precious metals contained in the catalyst can be recovered. These metals could then be recycled and the remaining material would most likely need to be disposed of at a landfill.

If the catalyst is not hazardous, jurisdiction for its disposal then shifts to local agencies such as the Regional Water Quality Control Board (RWQCB) or the county environmental agencies. The RWQCB has indicated that if a spent catalyst is not considered a hazardous waste, it would probably be considered a Designated Waste. A Designated Waste is characterized as a non-hazardous waste consisting of, or containing pollutants that, under ambient environmental conditions, could be released at concentrations in excess of applicable water objectives, or which could cause degradation of the waters of the state. The type of landfill that the material is disposed at will depend upon its final waste designation. The use of SCRs is expected to be limited to stationary sources in the RECLAIM program (e.g., refineries and electric generation facilities) or other heavy industrial uses (e.g., ports) so that its use is not expected to be wide-spread. Due to the regeneration of catalysts used in SCRs and the fact that this technology is not expected to be widely used because of cost, no significant impacts on waste disposal are expected.

4.6.4.3 Retirement of Equipment

Control measures ECC-03, CMB-01, CMB-02, CMB-03, CMB-04, CMB-05, FLX-02, BCM-01, BCM-02, BCM-09, MOB-01, MOB-02, MOB-03, MOB-04, MOB-05, MOB-06, MOB-07, MOB-08, MOB-09, MOB-10, MOB-11, MOB-12, MOB-13, MOB-14, ORLD-01, ORLD-03, ORHD-02, ORHD-04, ORHD-06, ORHD-06, ORHD-07, ORHD-08, and ORHD-09 could result in the early retirement of equipment such as burners, on-road trucks and vehicles, off-road vehicles, gasoline-fueled engines, diesel-fueled engines, and locomotive and aircraft engines. Solid waste impacts could occur since the older equipment or vehicle parts would be taken out of service in the Basin and scrapped and disposed of in landfills. It is expected that some older trucks, vehicles, and locomotive engines could be relocated to other areas, such as other states, Mexico or China.

Approximately 80 percent of a vehicle can be recycled and reused in another capacity. During the scrapping process, batteries, catalytic converters, tires, and other recoverable materials (e.g., metal components) are removed and the metal components of the vehicle are shredded. The shredded material is then sent for recovery of metal content. Therefore, the amount of solid waste landfilled as a result of the proposed control measures would be relatively small since most of the parts being replaced have commercial value as scrap metal. Currently, there are a limited number of vehicles and parts that can be scrapped per year because of the limited number of scrapping and recycling facilities in the Basin. It is expected that gasoline and diesel engines could also be recycled for metal content, or rebuilt and sold to other areas. It is expected that parts and equipment would be scrapped in the near future, regardless of the 2016 AQMP control measures, as they are older vehicles or have older components. The primary solid waste impact is expected to be the accelerated replacement and disposal of equipment and parts before the end of their useful life. Further, these control measures are not expected to mandate that older vehicle, engines, or other equipment be scrapped. The control measures are expected to allow a number of different control methods to comply with the required emission reductions. The most cost effective control measures would be expected to be implemented. Control measures that would require new equipment will generally require that retirement occur when the life of the old equipment is exhausted and the new equipment is put into service. Alternatively, some measures can encourage advanced deployment of cleaner technologies ahead of natural retirement for the benefit of air quality. Based on the above, scrap metals from vehicle and engine replacements are expected to be recycled and not disposed of in landfills. Any small increase that may occur from miscellaneous parts is expected to be within the permitted capacity of over 112,000 tons per day so that no significant impacts would be expected.

The California Integrated Waste Management Act of 1989 (AB 939) requires cities and counties in California to reduce the amount of solid waste disposed in landfills and transformed by 25 percent by 1995 and by 50 percent by 2000, through source reduction, recycling, and composting activities. Subsequent legislation has been adopted that mandates a 50 percent diversion requirement to be achieved every year. SB 1016 (Wiggins) – Diversion: Alternative Compliance System (effective January 1, 2009) moves CalRecycle from the previously existing solid waste diversion accounting system to a per capita disposal based system. SB 1016 did not change the 50 percent requirement in AB 939, but measures it differently. Compliance is the same under the new system as it was under the old system. To evaluate compliance, CalRecycle looks at a jurisdiction's per capita disposal rate as an indicator of how well its programs are doing to keep disposal at or below a jurisdiction's unique 50 percent equivalent per capita disposal target. The 50 percent equivalent per capita disposal target is the amount of disposal a jurisdiction would have had during the base period had it been at exactly a 50 percent diversion rate. Compliance is based on CalRecycle evaluating whether a jurisdiction is continuing to implement the programs it chooses and is making progress in meeting its target (CalRecycle, 2016). In 2014, California's statewide disposal was 31.2 million tons and population was 38.4 million residents. This resulted in a per resident disposal rate of 4.5 pounds/resident/day. The diversion rate equivalent was 65 percent (CalRecycle, 2016a and 2016b).

Almost all (99 percent) of California's solid waste was disposed of in landfills in California, while approximately one percent was exported to landfills out of state. An additional 0.82 million tons were transformed at three permitted waste-to energy plants in California, but not included in the disposal rate estimate because of provisions in the law that allow limited diversion credit for transformation (CalRecycle, 2016a and 2016b).

Many cities and counties have met the 20 and 50 percent waste reduction goals of AB 939 prior to the adoption of the 50 percent equivalent per capita disposal target associated with SB 1016. Table 4.6-3 shows that for the counties within the Basin as well as statewide, the targets are still slightly short of meeting the diversion standards. The generation of additional waste associated with control measures in the 2016 AQMP could impact the abilities of cities and counties to further reduce wastes. However, as discussed above the increase in solid waste associated with implementation of the 2016 AQMP that is expected to be diverted to a landfill is small and many of the waste streams are recyclable.

The U.S. EPA has a policy to ensure that emission reductions programs seeking credit in the SIP are quantifiable, surplus (*not already required*), permanent, and enforceable. Thus, it is expected that when older vehicles are scrapped, they are put out of service permanently and there are mechanisms in place to ensure that this requirement is enforced. Even with the ability to recycle metals from vehicles, there are no guarantees that vehicles will continue to be scrapped in the future, especially if the market will not be saturated with a high numbers of vehicles being sought for turnover. So, in an abundance of caution, the potential solid and hazardous waste impacts from the retirement of equipment is concluded to be significant.

TABLE 4.6-3

Summary of Per Capita Target Compliance (2014)

LOCATION	NUMBER OF JURISDICTIONS WITHIN LOCATION	NUMBER OF JURISDICTIONS MEETING POPULATION TARGET	PERCENT OF JURISDICTIONS MEETING POPULATION TARGET	NUMBER OF JURISDICTIONS MEETING EMPLOYEE TARGET	PERCENT OF JURISDICTIONS MEETING EMPLOYEE TARGET
State of California	412	397	96%	388	64%
Los Angeles County	72	71	99%	72	100%
Orange County	35	35	100%	33	94%
Riverside County	29	29	100%	26	90%
San Bernardino County	25	25	100%	25	100%

Source: CalRecyle, 2016c

4.6.4.4 Construction Waste

Implementation of the 2016 AQMP will result in the construction of new control devices which will generate waste attributable to the removal of old control devices, soil, construction debris from demolition, etc., and some of this waste could be characterized as hazardous waste. At this time, it is speculative to estimate the amount of construction waste that may be generated as the 2016 AMQP is implemented, since the extent and timing of individual projects is not known. Therefore, the solid and hazardous waste impacts from construction are concluded to be significant.

4.6.5 MITIGATION MEASURES

Based on the preceding analysis, due to the recycling value of the materials involved, the increased use of electric or hybrid vehicles and subsequent generation of batteries and other types of waste from air pollution control technology and devices were found to result in less than significant impacts to solid and hazardous waste.

For equipment that may be retired before the end of its useful life, that equipment may be reused in areas outside the Basin. Equipment with no remaining useful life is expected to be recycled for metal content. However, the high volume of vehicle and equipment to retire in a short timeframe and uncertainty of their outcome would result in potential significant solid and hazardous waste impacts due to implementation of the 2016 AQMP. Furthermore, the extent and timing of construction needed to implement the 2016 AQMP is not known at this time, but the potential to exceed landfill capacities in the short term was found to be significant. No mitigation measures have been identified.

4.6.6 IMPACTS AFTER MITIGATION

Although the monetary value of scrapped engines, vehicles, and equipment would likely lead to recycling of these items, no mitigation measures have been identified to reduce the impacts to landfills and the impacts remain significant. Short-term impacts from construction also remain significant.

4.7 TRANSPORTATION AND TRAFFIC

4.7.1 INTRODUCTION

This subchapter examines the traffic impacts associated with implementing the proposed control measures in the 2016 AQMP. All control measures in the 2016 AQMP were evaluated to determine whether or not they could generate direct or indirect transportation and traffic impacts based on the anticipated methods of control.

The NOP/IS for the 2016 AQMP identified the following types of control measures as having potentially significant transportation and traffic impacts: 1) changes in traffic volumes and patterns due to construction activities; 2) operational traffic increases due to increased transportation of catalyst, alternative fuels, or other chemicals such as ammonia, waste disposal, and agricultural materials (from chipping, grinding, or composting facilities); 3) increases in congestion due to increased street sweeping; and 4) operation of new transportation infrastructure.

4.7.2 2016 AQMP CONTROL MEASURES WITH POTENTIAL TRANSPORTATION AND TRAFFIC IMPACTS

The 2016 AQMP continues the air quality management strategy of advancing clean technologies and promoting their use. Implementing some of the 2016 AQMP control measures could result in transportation and traffic impacts in the region. The transportation and traffic analysis in this Program EIR identifies the potential traffic impacts from implementing the 2016 AQMP. All control measures were analyzed to identify the potential transportation and traffic impacts. The NOP/IS determined that the proposed project could result in potentially significant transportation and traffic impacts.

Each control measure proposed in the 2016 AQMP was evaluated and 30 control measures were identified as having potential adverse transportation and traffic impacts. Table 4.7-1 contains a summary of the 2016 AQMP control measures which may result in the use of compliance options that could generate significant transportation and traffic impacts.

TABLE 4.7-1

Control Measures with Potential Transportation and Traffic Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	TRAFFIC IMPACT
ECC-03	Additional Enhancement in Reducing Existing Residential Building Energy Use (NOx, VOC)	Measure consists of incentives and promoting existing energy efficiency programs that would reduce criteria and GHG emissions.	Potential temporary changes in traffic pattern/volume due to construction activities.
ECC-04	Reduced Ozone Formation and Emission Reductions from Cool Roof Technology	Take credit for NOx, CO, PM, CO2 and ozone emissions reductions which would occur due to compliance with required energy efficiency mandates and state regulations.	Potential temporary changes in traffic pattern/volume due to construction activities.
CMB-01	Transition to Zero and Near-Zero Emission Technologies for Stationary Sources (NOx, VOC)	Incentivize transition to zero and near-zero emission technologies, specifically those in non-power plant combustion sources.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to increased waste disposal.
CMB-02	Emission Reductions from Commercial and Residential Space and Water Heating (NOx)	Installation of new commercial space heating furnaces boilers, water heaters, and space heating furnaces.	Potential temporary changes in traffic pattern/volume due to construction activities.
CMB-03	Emission Reductions from Non-Refinery Flares (NOx)	Installation of newer flares implementing the best available control technology.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to increased waste disposal.
CMB-05	Further NOx Reductions from RECLAIM Assessment (NOx)	Re-examination of the RECLAIM program, including voluntary opt-out and the implementation of additional control equipment and SCR equipment	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to increased catalyst use, ammonia use, and waste disposal.
BCM-03	Further Emission Reductions from Paved Road Dust Sources (PM)	Reduction of track out from stationary sources by specifying street sweeping methods and frequency.	Potential changes in traffic due to change in frequency of street sweeping activities.
BCM-04	Emission Reductions from Manure Management Strategies (NH3)	Acidifier application, manure removal, manure slurry injection, and feed additives to reduce ammonia in manure.	Potential temporary changes in traffic pattern/volume due to operational impacts due to deliveries of SBS and increased waste disposal.
BCM-05	Ammonia Emission Reduction from NOx Controls (NH3)	Installation and use of advanced catalyst technology for the conversion of ammonia.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to deliveries of catalyst and increased waste disposal.

TABLE 4.7-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	TRAFFIC IMPACT
BCM-06	Emission Reductions from Abrasive Blasting Operations (PM)	Construction of exhaust ventilation to a fabric filter for permanent in building abrasive blasting activities and the use of additional portable equipment like negative air machines, fume extractors, and dust collectors with HEPA filters.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to increased waste disposal.
BCM-07	Emission Reductions from Stone Grinding, Cutting, and Polishing Operations (PM)	Installation of engineering controls, such as exhaust ventilation with dust collectors, the use of wet methods like wet-wiping or wet sweeping, and vacuuming with a HEPA filter.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to increased waste disposal.
BCM-08	Further Emission Reductions from Agricultural, Prescribed, and Training Burning (PM)	Incentivize chipping/grinding or composting in the place of agricultural burning as well as the increased utilization of clean fuels for training burns.	Potential traffic impacts associated with increased transportation of agricultural materials to chipping, grinding, or composting facilities.
BCM-09	Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves (PM)	Incentivize upgrading of wood burning hearths to cleaner hearth as well as an increase in the stringency of the curtailment program and education.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to increased waste disposal.
MOB-01	Emission Reductions at Commercial Marine Ports (NOx, SOx, CO)	Financial incentives for cleaner vessels, vehicles, and use of alternative fuels or fuel additives at marine ports.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to deliveries of alternative fuels/additives and increased waste disposal.
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program (NOx, PM)	Incentivizing the use of zero emission technologies, the building of electric or magnetic power into roadway infrastructure to reduce emissions.	Potential changes in traffic pattern/volume due to construction activities and operation of new roadway infrastructure.
TXM-01	Control of Metal Particulate from Metal Grinding Operations (TACs, PM)	Construction of enclosures and control equipment such as exhaust ventilation with dust collectors, use of wet methods like wet-wiping or wet sweeping to prevent dust release and other measures like vacuuming with a HEPA filter.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to deliveries of filtration supplies and increased waste disposal.

TABLE 4.7-1 (cont.)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	TRAFFIC IMPACT
TXM-02	Control of Toxic Metal Particulate Emissions from Plating and Anodizing Operations (TACs, PM)	Modification of existing equipment, construction of enclosures and control equipment, such as exhaust ventilation with dust collectors, and the implementation of new measures like vacuuming with a HEPA filter and wet-wiping to prevent dust emission.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to deliveries of filtration supplies and increased waste disposal.
TXM-04	Control of Toxic Metal Particulate Emissions from Contaminated Soils (TACs, PM)	Construction of and operation of enclosures and control equipment, such as HEPA filters, and wet methods to prevent dust release.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to deliveries of filtration supplies and increased waste disposal.
TXM-05	Control of Toxic Metal Particulate Emissions from Laser Plasma Cutting (TACs, PM)	Construction and operation of enclosures and control equipment, such as HEPA filters.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to deliveries of filtration supplies and increased waste disposal.
TXM-06	Control of Toxic Emissions from Metal Melting Facilities (TACs, PM)	Construction and operation of enclosures and control equipment, such as exhaust ventilation with filters/baghouses, and the implementation of methods to prevent dust release including wet-wiping and vacuuming with HEPA filters.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to deliveries of filtration supplies and increased waste disposal.
TXM-07	Control of Lead Emissions from Stationary Sources (TACs, PM)	Construction and implementation of control equipment to minimize lead emissions as well as the use of best management practices.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to increased waste disposal.
TXM-09	Control of Toxic Emissions from Oil and Gas Well Activities (TACs, PM)	Construction and operation of enclosures and control equipment and implementation of method to prevent dust release such as wet-wiping and vacuuming with a HEPA filter.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to deliveries of filtration supplies and increased waste disposal.
ORHD-05	Last Mile Delivery (NOx, ROG)	Acceleration of the penetration of zero and near-zero emission last mile delivery trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential changes in traffic pattern/volume due to construction activities, deliveries of alternative fuels, and operation of new roadway infrastructure.

TABLE 4.7-1 (concluded)

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	TRAFFIC IMPACT
ORHD-06	Innovative Technology Certification Flexibility (NOx)	Acceleration of the penetration of zero and near-zero emission heavy duty trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential changes in traffic pattern/volume due to construction activities, deliveries of alternative fuels, and operation of new roadway infrastructure.
ORHD-08	Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission heavy duty vehicle engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential changes in traffic pattern/volume due to construction activities, deliveries of alternative fuels, and operation of new roadway infrastructure.
ORHD-09	Further Deployment of Cleaner Technology: On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential changes in traffic pattern/volume due to construction activities, deliveries of alternative fuels, and operation of new roadway infrastructure.
ORFIS-01	More Stringent National Locomotive Standards (NOx, ROG)	Use of Tier 5 Control equipment such as SCRs, alternative fuels, DPM filters and electric batteries.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to increased ammonia and catalyst use and waste disposal.
ORFIS-03	Incentivize Low Emission Efficient Ship Visits (NOx, PM)	Incentives for the use of control equipment such as SCRs.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to increased ammonia and catalyst use and waste disposal.
ORFIS-04	At-Berth Regulation Amendments (NOx, ROG)	Further reduce emissions from ships at berth and advance the use of near-zero and zero emission technologies.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to increased ammonia and catalyst use and waste disposal.
OFFS-07	Low Emission Diesel Requirement (NOx, PM)	Reformulation of diesel fuel to lower amount of emissions.	Potential temporary changes in traffic pattern/volume due to construction activities and operational impacts due to increased waste disposal.

4.7.3 SIGNIFICANCE CRITERIA

The NOP/IS (Appendix A) concluded that the 2016 AQMP would not conflict with an applicable transportation plan, ordinance, or policy; result in a change in air traffic patterns; substantially increase hazards due to a design feature or incompatible uses; result in inadequate emergency access; or conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities. However, implementation of the 2016 AQMP would be considered to have significant transportation and traffic impacts if any of the following conditions occur:

- Peak period levels on major arterials are disrupted to a point where level of service (LOS) is reduced to D, E, or F for more than one month.
- An intersection's volume to capacity ratio increase by 0.02 (two percent) or more when the LOS is already D, E or F.
- A major roadway is closed to all through traffic, and no alternate route is available.
- There is an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system.
- The demand for parking facilities is substantially increased.
- Water borne, rail car, or air traffic is substantially altered.
- The need for more than 350 employees
- An increase in heavy-duty transport truck traffic to and/or from the facility by more than 350 truck round trips per day
- Increase customer traffic by more than 700 visits per day.

4.7.4 IMPACT ANALYSIS

For purposes of evaluating potential traffic impacts, it has been assumed herein that no new rail or truck traffic routes will be constructed, but rather some of the existing routes/corridors may be modified to include catenary overhead electrical lines. The Blue Line, Green Line, and Gold Line currently being operated in the Los Angeles County by the Metropolitan Transportation Authority are examples of existing catenary overhead electrical line systems within the southern California area. In addition, control measures ECC-03, ECC-04 and CMB-02 would cause minor traffic impacts associated with construction workers and material deliveries necessary to install solar panels, cool roof technology, and water heaters at residences.

4.7.4.1 Construction Impacts

The existing rail and truck routes/corridors that could be modified to construct electric and/or magnetic power infrastructure are located primarily in commercial and industrial zones within the southern California area. Examples of these areas include, but are not limited to, the Port of Los Angeles, Port of Long Beach, and industrial areas in and around container transfer facilities (rail and truck) near the Terminal Island Freeway, along the Alameda Corridor, as well as inland facilities. Since only existing transportation routes will be modified, no new transportation routes are anticipated as part of the proposed project, project impacts will be temporary in nature and limited to construction activities.

Implementation of Control Measures MOB-09, ORHD-05, ORHD-06, ORHD-08 and ORHD-09 could require the installation of catenary overhead electrical lines and fixed guideway systems, battery charging stations, and fueling infrastructure within or adjacent to existing roadways, streets, freeways, and/or transportation corridors. Construction activities would generate traffic associated with construction worker vehicles and trucks delivering equipment, and materials and supplies to the project site during the duration of the construction activities. Additional traffic will be generated by the 2016 AQMP due to the need to transport increased waste for disposal (e.g., construction debris). Heavy construction equipment such as backhoes, cranes, cherry pickers, front end loaders, and other types of equipment would be used to carry out the aforementioned construction activities. Construction activities would be expected to occur within or adjacent to existing roadways which could require lane closures to protect construction workers and avoid traffic conflicts. These construction activities are expected to occur along heavily travelled roadways (e.g., roads near the ports, such as Sepulveda Boulevard, Terminal Island Freeway, on Navy Way at the Port of Los Angeles, and Alameda Street). Construction traffic could potentially result in increased traffic volumes on heavily traveled streets and require temporary lane closures. Construction activities may result in the following impacts:

- Temporary reduction in the level of service on major arterials;
- Temporary closure of a roadway or major arterial;
- Temporary closure of a railroad line;
- Temporary impact on businesses or residents within the construction area;
- Removal of on-street parking; and
- Conflict with public transportation system (e.g., temporary removal of bus stops).

Construction activities necessary to modify existing rail and truck routes/corridors would vary depending on the location and the specific traffic impacts are unknown. Project specific impacts would require a separate CEQA evaluation. However, the above listed traffic impacts, although temporary in nature, could be significant and result in a reduction of LOS at local intersections, result in partial or temporary road or lane closures, result in additional traffic congestion, and potentially impact roadways within the County's congestion management plan.

4.7.4.2 Operational Activities

Because control measures MOB-09, ORHD-05, ORHD-06, ORHD-08 and ORHD-09 are expected to apply to existing transportation corridors, no new streets, roads, freeways, or rail lines are expected to be needed as part of implementing the 2016 AQMP. Implementation of control measures MOB-09, ORHD-05, ORHD-06, ORHD-08, and ORHD-09 may contribute to significant adverse operational traffic impacts on roadways because transportation infrastructure improvements pertaining to overhead catenary electrical lines could require the dedication of an existing lane exclusive to vehicles using the overhead catenary electrical lines or fixed guideway systems. The dedication of an existing lane would mean that other vehicles would have reduced access to available driving lanes. Thus, a reduction in the number of available lanes on a roadway to accommodate vehicles using the overhead catenary electrical lines may occur which could adversely affect traffic and congestion for all other vehicles on the road.

MOB-01 might result in an increase of harbor traffic, if the ports decide to use the barge-based bonnet system to capture emissions from ocean-going vessels. The additional number of vessels is speculative at this time, but could potentially result in significant impacts to transportation and traffic by creating congestion and causing an increase in traffic hazards in the harbors.

The number of zero and near-zero emission vehicles that will be driving on roadways in the Basin are projected to substantially increase between year 2016 and year 2031, because a number of Control Measure would accelerate the penetration of zero emission vehicles, trucks, buses, and heavy-duty trucks (see Table 4.7-2). The 2016 AQMP would result in an estimated increase of over 700,000 partial-zero and zero emission vehicles, 11,000 partial-zero and zero emission buses, and 115,000 partial-zero and zero heavy emission trucks by 2031. The goal of proposed control measures is to replace older vehicles with new technology vehicles upon retirement. The transition to zero or near-zero trucks will replace existing trucks but will not change the number of trucks travelling in the Basin or affect the number of vehicle miles travelled on an annual basis. Incentives provided to increase the penetration of partial-zero and zero emission mobile sources would also be expected to include the retirement (removal of the sources from the Basin through scrapping or sold outside of the State) of the existing gasoline/diesel mobile sources to assure that the intended environmental and air quality benefits of the program are achieved. Therefore, no increase in mobile sources would be expected and no related traffic and circulation impacts would be generated.

TABLE 4.7-2

Estimated Increase in Electric Mobile Sources

CONTROL MEASURE NO.	CONTROL MEASURE DESCRIPTION	ESTIMATED INCREASE IN VEHICLES	
		2023	2031
MOB-05, MOB-14, ONLD-01, and ORLD-03	Accelerated Penetration of Partial-Zero and Zero Emission Vehicles	357,000	714,000
ORHD-04	Advanced Clean Transit, Accelerated Penetration of Partial-Zero and Zero Emission Buses	11,000	11,000
MOB-06, MOB-07, MOB-08, ORHD-03, ORHD-04, ORHD-05, ORHD-06, ORHD-08	Accelerated Penetration of Partial-zero and Zero Emissions Light, Medium and Heavy-Duty Trucks	115,000	245,000

Similarly, implementation of MOB-09, ORHD-05, ORHD-06, ORHD-08, and ORHD-09 may alter railway traffic due to infrastructure improvements pertaining to overhead catenary electrical lines. However, specific design features are unknown at this time. As such, to identify any impacts at this time without knowing the specific design features would be speculative. Nonetheless, when details of the project become available, any proposed modifications to an existing rail or truck traffic route/corridor will require a separate CEQA evaluation to analyze specific traffic impacts and identify appropriate mitigation measures. Regardless, a reduction in the number of available lanes on a roadway to accommodate vehicles using the overhead catenary electrical lines could adversely affect traffic and congestion for all other vehicles on the road.

Additional traffic will be generated by the 2016 AQMP due to the need to transport increased waste for disposal (e.g., waste from scrapping of old equipment/vehicles, and waste from air pollution control equipment, such as filters), increased waste material for recycling (e.g., catalysts), increased use of products (e.g., ammonia, catalysts, SBS, alternative fuels/additives), and increased transportation or agricultural material for chipping, grinding, or composting facilities. At this time, it is not known what control strategies may be applied, which facilities may require additional trips, or how often these trips may be necessary. Therefore, no traffic estimates can be prepared at this time. The impacts of the proposed project on traffic and transportation are expected to be significant prior to mitigation. While mitigation measures could help minimize some of the impacts, the SCAQMD cannot predict how a future lead agency might choose to mitigate a particular significant traffic and transportation impact. Thus, the future traffic and transportation impacts are considered to be significant due to implementation of the 2016 AQMP control measures.

4.7.5 MITIGATION MEASURES

The impact of the proposed project on traffic and circulation during construction, although temporary in nature, are considered significant. In addition, the impact of the proposed project on traffic and circulation during operation, are considered significant if an existing roadway is dedicated exclusively as a truck lane for vehicles using the overhead catenary electrical lines or fixed guideway systems because traffic patterns and congestion may be altered. Furthermore, if the barge-based bonnet technology is used to reduce emissions from ocean going vessels, the increase in barges at the harbors could create a significant congestion and traffic hazard impact. No mitigation measures have been identified to reduce the operational transportation and traffic impacts.

In order to mitigate potential construction traffic impacts, project-specific information would be necessary in order to first identify the specific impacts (e.g., project location, distance of roadway to be altered, etc.) to develop appropriate mitigation measures. The following mitigation measures have been identified to reduce traffic and transportation impacts:

TR-1 Develop a construction management plan that includes at least the following items and requirements, if determined to be feasible by the Lead Agency:

- A set of comprehensive traffic control measures, including scheduling of major truck trips and deliveries to avoid peak traffic hours, detour signs if required, lane closure procedures, signs, cones for drivers, and designated construction access routes;

- Notification procedures for adjacent property owners and public safety personnel regarding when major deliveries, detours, and lane closures will occur;

- Location of construction staging areas for materials, equipment, and vehicles at an approved location;

- A process for responding to and tracking complaints pertaining to construction activity, including identification of an onsite complaint manager. The manager shall determine the cause of the complaints and shall take prompt action to correct the problem. The Lead Agency shall be informed who the Manager is prior to the issuance of the first permit;

- Provision for accommodation of pedestrian flow;

- As necessary, provision for parking management and spaces for all construction workers to ensure that construction workers do not park in street spaces;

- Any damage to the street caused by heavy equipment, or as a result of this construction, shall be repaired, at the project sponsor's expense, within one week of the occurrence of the damage (or excessive wear), unless further damage/excessive wear may continue; in such case, repair shall occur prior to issuance of a final inspection of the building permit. All damage that is a threat to public health or safety shall be repaired immediately. The street shall be restored to its condition prior to the new construction as established by the Lead Agency (or other appropriate government agency) and/or photo documentation, at the sponsor's expense, before the issuance of a Certificate of Occupancy;

- Any heavy equipment brought to the construction site shall be transported by truck, where feasible;

- No materials or equipment shall be stored on the traveled roadway at any time;

- Prior to construction, a portable toilet facility and a debris box shall be installed on the site, and properly maintained through project completion;

- All equipment shall be equipped with mufflers;

- Prior to the end of each work-day during construction, the contractor or contractors shall pick up and properly dispose of all litter resulting from or related to the project, whether located on the property, within the public rights-of-way, or properties of adjacent or nearby neighbors; and

- Promote "least polluting" ways to connect people and goods to their destinations.

4.7.6 IMPACTS AFTER MITIGATION

No mitigation measures were identified to reduce the significant impacts from the exclusive dedication of existing lanes of vehicle traffic travel as a truck lane for vehicles using the overhead catenary electrical lines or fixed guideway systems because traffic patterns and congestion may be altered or for the significant impacts associated with the increase in vessels in the harbor should the barge-based bonnet technology be used. Therefore, the ~~operational~~transportation and traffic impacts remain significant. Although mitigation measure TR-1 would reduce transportation and traffic impacts during construction, those impacts would still remain significant.

4.8 AESTHETICS

4.8.1 INTRODUCTION

This subchapter examines the aesthetic impacts associated with implementing the proposed control measures in the 2016 AQMP. All control measures in the 2016 AQMP were evaluated to determine whether or not they could generate direct or indirect aesthetic impacts based on the anticipated methods of control.

The NOP/IS for the 2016 AQMP did not identify any control measures as having potentially significant aesthetic impacts. However, comments were received on the NOP/IS relative to aesthetics impacts. After consideration of these comments and further review of the control measures, implementation of some 2016 AQMP control measures could change the existing visual character or quality of any site on which certain types of technologies may be installed and its surroundings and result in glare. Therefore, analysis of these potentially significant impacts have been included.

4.8.2 2016 AQMP CONTROL MEASURES WITH POTENTIAL AESTHETICS IMPACTS

The 2016 AQMP continues the air quality management strategy of advancing clean technologies and promoting their use. Implementing some of the 2016 AQMP control measures could result in aesthetics impacts in the region. The aesthetics analysis in this Program EIR identifies the potential aesthetics impacts from implementing the 2016 AQMP. All control measures were analyzed to identify the potential aesthetics impacts.

Each control measure proposed in the 2016 AQMP was evaluated and eight control measures were identified as having potential adverse aesthetics impacts. Table 4.8-1 contains a summary of the 2016 AQMP control measures which may result in the use of compliance options that could generate significant aesthetics impacts.

TABLE 4.8-1

Control Measures with Potential Aesthetics Impacts

CONTROL MEASURE	CONTROL MEASURE TITLE (POLLUTANT)	CONTROL METHODOLOGY	AESTHETICS IMPACT
ECC-03	Additional Enhancement in Reducing Existing Residential Building Energy Use (NOx, VOC)	Measure consists of incentives and promoting existing energy efficiency programs that would reduce criteria and GHG emissions.	Potential glare impacts due to the installation of solar panels on roofs.
ECC-04	Reduced Ozone Formation and Emission Reductions from Cool Roof Technology	Take credit for NOx, CO, PM, CO2 and ozone emissions reductions which would occur due to compliance with required energy efficiency mandates and state regulations.	Potential glare impacts due to solar reflectance from the use of cool roof technology.
MOB-1	Emission Reductions at Commercial Marine Ports (NOx, SOx, PM)	Financial incentives for cleaner vessels, vehicles, and use of alternative fuels or fuel additives at marine ports.	Change in visual character due to the use of bonnets on top of marine vessel stacks.
ORHD-05	Last Mile Delivery (NOx, ROG)	Acceleration of the penetration of zero and near-zero emission last mile delivery trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential aesthetics impacts due to construction and operation of new roadway infrastructure (e.g., overhead catenaries).
ORHD-06	Innovative Technology Certification Flexibility (NOx)	Acceleration of the penetration of zero and near-zero emission heavy duty trucks through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential aesthetics impacts due to construction and operation of new roadway infrastructure (e.g., overhead catenaries).
ORHD-08	Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission heavy duty vehicle engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential aesthetics impacts due to construction and operation of new roadway infrastructure (e.g., overhead catenaries).
ORHD-09	Further Deployment of Cleaner Technology: On-Road Heavy Duty Vehicles (NOx, ROG, PM2.5)	Acceleration of the penetration of zero and near-zero emission engines through the use of alternative fuels and the construction of electric and magnetic power built into roadway infrastructure.	Potential aesthetics impacts due to construction and operation of new roadway infrastructure (e.g., overhead catenaries).
ORFIS-04	At-Berth Regulation Amendments (NOx, ROG)	Further reduce emissions from ships at berth and advance the use of near-zero and zero emission technologies.	Change in visual character due to the use of bonnets on top of marine vessel stacks.

4.8.3 SIGNIFICANCE CRITERIA

Implementation of the 2016 AQMP would be considered to have significant aesthetics impacts if any of the following criteria apply:

- Substantial adverse effect on scenic vistas;
- Substantial damage to scenic resources, including but not limited to trees, rock outcroppings, and historic building within a state scenic highway;
- Creation of a new source of substantial light or glare which would adversely affect day or nighttime views in the area

4.8.4 IMPACT ANALYSIS

Potential aesthetics impacts associated with the 2016 AQMP include: 1) substantial adverse effect on a scenic vista; 2) substantial damage to scenic resources, including, but not limited to, trees, rock outcropping, and historic buildings within a state scenic highway; 3) substantial degradation of the existing visual character or quality of the site and its surrounds; and, 4) creating a new source of substantial light or glare which would adversely affect day or nighttime views in the area. Four control measures could require the installation of catenary overhead electrical lines and fixed guideway systems, battery charging stations, and fueling infrastructure. For purposes of evaluating potential aesthetic impacts for these control measures, the analysis in this Program EIR assumes that no new rail or truck traffic routes will be constructed, but some of the existing routes/corridors may be modified to include catenary overhead electrical lines. The Blue Line, Green Line, and Gold Line currently being operated in the Los Angeles County by the Metropolitan Transportation Authority are examples of existing catenary overhead electrical line systems within the southern California area. Additionally, two control measures would promote the use of bonnets on top of marine vessel stacks to reduce emissions which could change the visual character of the area where these units are operated, and two other control measures would promote the addition of solar panels on roofs and the use of cool roof technology which could increase glare impacts.

4.8.4.1 Construction Impacts

The existing rail and truck routes/corridors that could be modified to construct electric and/or magnetic power infrastructure are located primarily in commercial and industrial zones within the southern California area. Examples of these areas include, but are not limited to, the Port of Los Angeles, the Port of Long Beach, and other industrial areas located in and around container transfer facilities (rail and truck) near the Terminal Island Freeway, along the Alameda Corridor, as well as inland facilities.

Implementation of control measures ORHD-05, ORHD-06, and ORHD-08 and ORHD-09 could require the installation of catenary overhead electrical lines and fixed guideway systems, battery charging stations, and fueling infrastructure within or adjacent to existing roadways, streets, freeways, and/or transportation corridors. Implementation of ECC-03 and ECC-04 could require the installation of solar panels and cool roof technology such as solar reflectance. MOB-01 and

ORFIS-04 would lead to the use of bonnet technology, which could be either land-based or barge-based, to reduce emissions from marine vessels.

The potential locations for catenary overhead power lines (near Port facilities, transportation corridors, and railyards) would not be visible to Route 1 at State Route 19 due to the numerous structures and topography between the two locations. There are no officially designated Scenic Highways or highways eligible for State Scenic Highway Designation in areas affected by construction of zero or near-zero emission equipment associated with the 2016 AQMP. The bonnet technology would be used at the Port of Los Angeles and the Port of Long Beach, both of which are located in the Basin. While there would be no construction associated with the barge-based systems, dockside construction may be needed if the land-based systems are used.

The installation of solar panels or cool roof technology could potentially occur in both residential and commercial areas. During construction, the equipment staging and laydown areas would be in close proximity to the each affected site and could create a temporary, but potentially significant aesthetic impact due to the degradation of the existing visual character of the each affected sites.

4.8.4.2 Operational Activities

As discussed under construction activities, control measures associated with potential aesthetics impacts in the 2016 AQMP are due to the potential installation of permanent catenary lines (overhead power lines) to power zero and near-zero emission trucks and locomotives, the use of bonnet technology on marine vessel stacks, and the installation and use of solar panels and cool roof technology.

Aesthetic impacts from zero or near-zero emission equipment are primarily associated with the permanent placement of catenary poles and overhead wires. As previously stated, most of the areas within the Basin where such equipment is being considered are primarily heavily industrialized areas and major transportation corridors. The heavily industrialized areas around the ports, near the cargo transfer facilities serving the ports, along existing transportation corridors, and the cargo transfer railyards, are not near an officially designated Scenic Highway or a roadway eligible for State Scenic Highway Designation, i.e., the overhead lines would be at least five miles away. At this distance, the overhead power lines and catenary system would not be visible to an officially designated Scenic Highway or to a roadway eligible for designation as a Scenic Highway. As such, implementation of the 2016 AQMP would not result in significant aesthetic impacts to scenic highways. However, the catenary poles and overhead electric wires could degrade the existing visual character or quality of the surrounding area, especially in areas which extend the existing Metro lines to populated areas.

Similarly, while the use of bonnet technology could degrade the existing visual character or quality in the immediate surrounding area, it is unlikely that the use of bonnet technology would be visible from sensitive public vantage points due to the presence of intervening structures at the ports. One example of the use of this bonnet technology is the installation of a dockside catalytic control system (DoCCS) at the Mitsubishi Cement Facility Modification Project at the Port of Long Beach[1].

Implementation of Control Measures ECC-03 and ECC-04 could lead to increased installation and use of solar panels and cool roof technology, such as solar reflectance, on existing structures. Therefore, these technologies could create a significant source of glare as a result of the 2016 AQMP.

Based on the above, implementation of the 2016 AQMP may substantially degrade the existing visual character or quality of a site and its surroundings from the installation of catenary lines and use of bonnet technology. Furthermore, the installation and use of solar panels and cool roof technology could create a significant source of glare. Therefore, aesthetics impacts during operation are considered potentially significant.

4.8.5 MITIGATION MEASURES

The aesthetics impacts that may result from implementing eight control measures in the 2016 AQMP during construction and operation is considered significant and mitigation measures are required to minimize these . The following feasible mitigation measures are required:

AE-1 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.

AE-2 All construction, operation, and maintenance areas would be kept clean and tidy, including the re-vegetation of disturbed soil and storage of construction materials and equipment would be screened from view and/or are generally not visible to the public, where feasible.

AE-3 Siting projects and their associated elements next to important scenic landscape features or in a setting for observation from State scenic highways, national historic sites, national trails, and cultural resources should be avoided to the greatest extent feasible.

AE-4 Apply development standards and guidelines to maintain compatibility with surrounding natural areas, including site coverage, building height and massing, building materials and color, landscaping, site grading, and so forth in accordance with general plans, master plans, and adopted design guidelines, where applicable.

AE-5 To reduce glare, provide structural and/or vegetative screening from light-sensitive uses, where feasible.

[1] The NOP/IS (http://www.polb.com/civica/filebank/blobdload.asp?BlobID=8645) for the project concluded that aesthetic impacts from the DoCCS would be less than significant.

4.8.6 IMPACTS AFTER MITIGATION

While the above mitigation measures could minimize some of the aesthetics impacts, the SCAQMD cannot predict how a lead agency might choose to mitigate a particular significant aesthetics impact for future project(s) located in areas with project-specific features and issues. Thus, the potential exists for impacts for future projects to be significant even after feasible mitigation measures are identified and imposed. Therefore, aesthetics impacts that may occur as a result of implementing the 2016 AQMP are expected to remain significant after mitigation.

4.9 POTENTIAL ENVIRONMENTAL IMPACTS FOUND NOT TO BE SIGNIFICANT

The environmental effects of the proposed plan that may have potentially significant adverse effects on the environment are identified, evaluated, and discussed in detail in the preceding portions of Chapter 4 of this Program EIR and in the NOP/IS (Appendix A) per the requirements of the CEQA Guidelines (§§15126(a) and 15126.2). The potentially significant adverse environmental impacts as determined by the NOP/IS (Appendix A) include: air quality and greenhouse gas emissions; hazards and hazardous materials; hydrology and water quality; noise; solid and hazardous waste; and transportation and traffic. After circulation of the NOP/IS, aesthetic impacts were also included in the EIR for further review. The analysis provided in the NOP/IS concluded that the following environmental topics would be less than significant: agriculture and forestry resources, biological resources, cultural resources; energy; geology and soils; land use and planning; mineral resources; population and housing; public services and recreation. The reasons for finding the environmental resources to be less than significant are explained below.

4.9.1 AGRICULTURE AND FORESTRY RESOURCES

Implementation of the 2016 AQMP is not expected to generate any new construction of buildings or other structures that would require the conversion of farmland to non-agricultural use or conflict with zoning for agricultural uses or with a Williamson Act contract. Proposed control measures would typically affect existing facilities that are located in appropriately zoned areas and new facilities that may be affected by control measures would be constructed and operated for reasons other than complying with the control measures. Therefore, it is not expected that implementing 2016 AQMP control measures would conflict with any forest land zoning codes or convert forest land to non-forest uses. Control measure BCM-04 Emission Reduction from Manure Management would call for the application of ammonia reducing agents to manure but it is not expected to cause a cost increase high enough to result in conversion of farmland to other uses. Additionally, land use and other planning considerations are determined by local governments and no agricultural land use or planning requirements would be altered by the proposed project. The 2016 AQMP control measures could provide benefits to agricultural and forest land resources through the improvement of air quality in the region, thus reducing the adverse oxidation impacts of ozone on plants and animals.

4.9.2 BIOLOGICAL RESOURCES

Implementation of the 2016 AQMP is not expected to result in habitat modification, adversely affect any riparian habitat or interfere with the movement of any native resident or migratory fish or wildlife species. Facilities affected by modifications from the proposed control measures generally occur in areas zoned as commercial or industrial which typically do not support candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service. Furthermore, existing industrial or commercial facilities typically have little to no plant life or plant life supporting wildlife species for fire safety reasons. Construction that impacts affected species is not reasonably foreseeable as part of implementation of the 2016 AQMP. Improving air quality is expected to provide health benefits to plant and animal species in the Basin.

Implementing some AQMP control measures may change or increase a facility's potential to generate wastewater. Affected industrial or commercial facilities are generally considered "point sources" and as such must release wastewater into POTWs under the NPDES permit program, administered by the RWQCB. Under CWA §404, direct discharge into federally protected wetlands is prohibited. Control measures promoting the installation of air pollution control at port facilities are not expected to have wastewater impacts. Port facilities are considered to be heavy industrial facilities consistent with this land use and are subject to water quality standards established in the California Ocean plan for any wastewater released into California's ocean waters. Therefore, the 2016 AQMP will not adversely affect protected wetlands as defined by CWA §404.

Land use plans, local polices, or ordinances, or regulations protecting biological resources are not expected to be affected by the proposed control measures as they primarily affect existing commercial and industrial facilities located in appropriately zones areas. The 2016 AQMP will not cause new development that would affect biological resources and such development would take place regardless of the 2016 AQMP. The SCAQMD does not have legal authority over land use decision except to impose certain air pollution requirements, which do not drive the land use approval process, and therefore, cannot alter or interfere with land use zoning ordinance or designations and cannot approve new land use projects. The 2016 AQMP is not expected to affect habitat conservation or natural community conservation plans, agricultural resources or operations, and would not create divisions in any existing communities for the reasons mentioned above.

4.9.3 CULTURAL RESOURCES

Facilities potentially affected by the implementation of the 2016 AQMP, where physical modification may occur, are typically located in appropriately zoned industrial or commercial areas that have previously been disturbed and are not typically considered to be historically significant. Further, it is unlikely that construction activities, including heavy construction activities like cut-and-fill excavation, at potentially affected existing facilities would uncover cultural resources as these existing facilities are located in previously disturbed areas. Affected facilities may have equipment older than 50 years old that needs to be modified, however such equipment does not typically meet criteria identified in CEQA Guidelines §15064.5(a)(3) to be considered historically significant. While the likelihood of encountering cultural or archaeological resources is low, there is still a potential that additional buried archaeological resources may exist. Any such impact from unexpected sub-surface resources would be eliminated by using standard construction practices and complying with state law including Public Resource Code §21083.2 and CEQA Guidelines §15064.5.

4.9.4 GEOLOGY AND SOILS

The Basin encompasses an area known to be seismically active. The 2016 AQMP control measures would not directly or indirectly expose people or structures to earthquake faults, seismic shaking, or seismic-related grounding failure. Control measures that would accelerate the penetration of zero or low emission off-road equipment would not affect geology or soils as they would continue to operate on existing roadways and are not expected to affect construction activities. Any structural modifications, which typically would occur in areas zoned as industrial or commercial, may be in areas where seismic-related activities are part of the existing setting. Modifications to affected facilities would be required to comply with the relevant California Building Code in effect at the time of initial construction or modification of a structure. The California Building Code requirements operate on the principle that providing appropriate foundations, among other aspects, helps to protect buildings from failure during earthquakes.

Any potentially affected facilities located in areas with historic occurrence of liquefaction must comply with more stringent requirements under the California Building Code. No control measures would require the location of new or relocation of existing facilities in areas prone to liquefaction. Further, the hazards are part of the existing setting and are not made worse through the implementation of the 2016 AQMP. Adverse soil erosion impacts are not expected because the modifications required by the 2016 AQMP are not expected to require substantial grading or construction activities. Additionally, the control measures would not promote the construction of residential or other types of land use projects in remote areas that would require septic tanks or other alternative waste disposal systems. Most of the potentially affected facilities are industrial or commercial and as such would have their own sewage facility connections and would not require the use of septic tanks or alternative waste water disposal systems.

4.9.5 LAND USE AND PLANNING

Implementation of the 2016 AQMP will promote the installation of stationary source control equipment at existing commercial or industrial facilities and would not create land use impacts because construction of new structures affecting land use planning would occur for reasons other than implementation of control measures and would occur regardless of the 2016 AQMP. Furthermore, SCAQMD has no land use authority except to impose air pollution control requirements, which do not drive the land use approval process.

Potential land use impacts associated with the 2016 AQMP are associated primarily with the construction of support system (e.g. magnetic infrastructure related to the operation of zero and near-zero transport systems). In evaluating potential impacts, it has been assumed herein that no new rail or truck traffic routes would be constructed, but rather that existing ones would be modified. No land use conflicts, or inconsistencies with any general plan, or zoning ordinance are expected since only existing transportation routes would be modified. It is possible that construction activities to modify transportation routes could temporarily disrupt or divide the community. However, because construction of new traffic routes/corridors is not required, once construction activities are finished and physical barriers removed, no long term land use impacts are anticipated. Any proposed modification to an existing rail or truck traffic route/corridor will require a separate CEQA evaluation but no significant land use impacts were identified because the proposed control measures would be expected to comply with, not interfere with, applicable land use plans, policies, or regulations of an agency with jurisdiction over the project.

Land use planning is handled at a local level and contributes to development of the 2016 AQMP growth projections. The 2016 AQMP does not affect local government land use planning decisions; instead the 2016 AQMP incorporates local land use planning decisions and population growth and complements SCAG's 2016 RTP/SCS.

4.9.6 MINERAL RESOURCES

The 2016 AQMP contains no provisions that would result in the loss of availability of a known mineral resource of value to the region and the residents of the state, or of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan. Incentives for the penetration of zero and near-zero emission technology in the 2016 AQMP are not expected to result in an increase in the use of mineral resources. Further, the 2016 AQMP is not expected to require substantial construction activities and would not have a significant impact on the use of important minerals, nor would the project result in covering over or otherwise making mineral resources unrecoverable. Therefore, no significant adverse mineral resource impacts are anticipated from implementing the 2016 AQMP.

4.9.7 POPULATION AND HOUSING

The 2016 AQMP would mainly affect existing commercial or industrial facilities in appropriately zones industrial or commercial areas and, as such, is not anticipated to generate any significant effects on the Basin's population or population distribution. It is expected that the existing labor pool within Southern California would accommodate labor requirements for any modifications required and that few or no new employees would need to be hired at affected facilities as the new control equipment is typically not labor intensive to operate or maintain. Implementing the mobile source control measures, like those that would accelerate the penetration of zero or low emission vehicles, would not induce population growth because there are a finite number of drivers in the region at any given time. Future population growth would occur in the region for reasons other than complying with the 2016 AQMP control measures and adopting the control measures is not expected to result in changes to population densities or induce significant growth in the population. The 2016 AQMP contains no provisions that would lead to displacement of a substantial number of people of existing housing nor necessitate the construction of replacement housing elsewhere.

4.9.8 PUBLIC SERVICES

No adverse public service impacts are expected as a result of adopting the 2016 AQMP as it would not result in the need for new of physically altered government facilities to maintain acceptable service ratios, response times, or other performance objectives. Most of the affected industrial facilities have on site security and fire protection personnel, so no increase in police or fire protection services is expected. In the absence of onsite police or fire protection services, the 2016 AQMP control measures would not hinder service ratios or response times. The control measures are not expected to require additional fire protection services to the extent that it would cause construction of new facilities because, pursuant to the Health and Safety Code, emergency or rescue vehicles used for responding to situations where potential threats to life or property exist are specifically exempt from regulations requiring alternative clean fueled vehicles. As noted in the discussion under "Population and Housing," implementing the 2016 AQMP would not cause a future population increase, this it is not expected to require the need for new of physically altered school facilities nor adversely affected existing public services or facilities. Anticipated development to accommodate future population growth would occur for reasons other than complying with the 2016 AQMP.

4.9.9 RECREATION

No provision contained in the 2016 AQMP would affect land use plans, policies, ordinances, regulations, or population growth, as discussed under "Land Use and Planning" and "Population and Housing." Land use and other planning considerations are determined by local governments and none of the land use or planning requirements relating to recreational facilities will be altered by the 2016 AQMP. Because the 2016 AQMP does not have the potential to induce population growth, the control measures will not increase the use of, or demand for, existing neighborhood and/or regional parks and recreational facilities or require construction of recreational facilities that might have an adverse physical effect on the environment. Additionally, control measures that require the installation of control equipment typically affect facilities in industrial or commercial zones and would not impact land use, including recreational facilities, at all.

4.10 OTHER CEQA TOPICS

4.10.1 GROWTH-INDUCING IMPACTS

CEQA defines growth-inducing impacts as those impacts of a proposed project that "could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects, which would remove obstacles to population growth" (CEQA Guidelines §15126.2 (d)).

To address this issue, potential growth-inducing effects are examined through the following considerations:

- Facilitation of economic effects that could result in other activities that could significantly affect the environment;
- Expansion requirements for one or more public services to maintain desired levels of service as a result of the proposed project;
- Removal of obstacles to growth through the construction or extension of major infrastructure facilities that do not presently exist in the project area or through changes in existing regulations pertaining to land development;
- Adding development or encroachment into open space; and/or
- Setting a precedent that could encourage and facilitate other activities that could significantly affect the environment.

4.10.1.1 Economic and Population Growth and Related Public Services

The 2016 AQMP would not directly foster economic or population growth or the construction of new housing in the southern California area. The control measures accommodate the projected growth for the region while still resulting in attaining the federal ozone and PM2.5 standards. However, the 2016 AQMP would not be the cause of residential, commercial, or industrial growth.

A project would directly induce growth if it would directly foster economic or population growth or the construction of new housing in the surrounding environment (e.g., if it would remove an obstacle to growth by expanding existing infrastructure such as new roads or wastewater treatment plants). The 2016 AQMP would not remove barriers to population growth, as it involves no changes to general plans, zoning ordinances, or related land use policies. Alternatively, the 2016 AQMP would not create barriers to projected population growth because it would result in avoiding sanctions or implementation of a Federal Implementation Plan, which could increase the New Source Review emission offset ratio or result in highway funding sanctions.

The 2016 AQMP does not include policies that would encourage the development of new housing or population-generating uses or infrastructure that would directly encourage such uses. The 2016

AQMP does not change jurisdictional authority or responsibility concerning land use or property issues. Land use authority falls solely under the purview of the local governments. The SCAQMD is specifically excluded from infringing on existing city or county land use authority (California Health & Safety Code §40414). Therefore, the 2016 AQMP would not directly trigger new residential development in the area or alter land use policies.

The 2016 AQMP may result in construction activities associated with implementation of certain control measures (e.g., control equipment at existing stationary sources or electrification along existing roadways). However, the 2016 AQMP would not directly or indirectly stimulate substantial population growth, remove obstacles to population growth, or necessitate the construction of new community facilities that would lead to additional growth in the Basin. It is expected that construction workers will be largely drawn from the existing workforce pool in southern California.

Considering the existing workforce in the region, it is expected that a sufficient number of workers are available locally and that few or no workers would relocate for construction jobs potentially created by the 2016 AQMP as construction activities would be spread over a period of about 15 years. Further, the 2016 AQMP would not be expected to result in an increase in local population, housing, or associated public services (e.g., fire, police, schools, recreation, and library facilities) since no increase in population or the permanent number of workers is expected. Likewise, the 2016 AQMP would not create new demand for secondary services, including regional or specialty retail, restaurant or food delivery, recreation, or entertainment uses. As such, the 2016 AQMP would not foster economic or population growth in the surrounding area in a manner that would be growth-inducing.

4.10.1.2 Removal of Obstacles to Growth

The 2016 AQMP is located within an existing urbanized area where adequate infrastructure is already in place to serve the existing surrounding population. The 2016 AQMP would not employ activities or uses that would result in growth inducement, such as the development of new infrastructure (e.g., new roadway access) that would directly or indirectly cause the growth of new populations, communities, or currently undeveloped areas. The 2016 AQMP is not expected to result in the use of large amounts of fuel or energy resources or result in the use of fuel or energy resources in a wasteful manner. However, the 2016 AQMP includes incentives to shift from diesel and gasoline fuel use to increased electrification of stationary and mobile sources and the use of alternative fuels. The 2016 AQMP could result in a substantial increase in electricity (greater than one percent of the existing electricity use in the Basin), and increased electricity demand is potentially significant. The demands for electricity associated with increased electrification of mobile sources could be partially offset by charging equipment (e.g., electric vehicles) at night when the electricity demand is low, thus minimizing impacts on peak electricity demands. In addition, any increase in electricity demand would likely result in a concurrent reduction in demand for other types of fuels, particularly petroleum-based fuels. Therefore, the 2016 AQMP would support the efficient use of energy by decreasing the use of fossil fuels and increasing the reliance on renewable energy sources, which in turn will provide a beneficial long-term operational impact on energy conservation.

According to Appendix F of the CEQA Guidelines, Energy Conservation, the wise and efficient use of energy includes: (1) decreasing overall per capita energy consumption; (2) decreasing reliance on fossil fuel such as coal, natural gas, and oil; and (3) increasing reliance on renewable energy sources. Implementation of the 2016 AQMP would increase the amount of renewable energy usage because vehicular fuels would increase the use of electricity and decrease the use of petroleum-based fuels through increased use of partial-zero and zero emission technologies and use of biodiesel. Thus the 2016 AQMP would support the efficient use of energy by decreasing the use of fossil fuels and increasing the reliance on renewable energy sources, providing a beneficial long-term operational impact on energy conservation. Further, the 2016 AQMP includes strategies that promote energy conservation (FLX-01) without identifying specific targets; therefore, its benefits have not been quantified in this analysis. However, growth induced by the 2016 AQMP would be limited to the increase in electricity to support the increased penetration of partial-zero and zero emission technologies.

4.10.1.3 Development or Encroachments into Open Space

Development can be considered growth-inducing when it is not contiguous to existing urban development and introduces development into open space areas. The 2016 AQMP affects facilities situated within the existing Basin, which is urbanized. The areas of the Basin where construction activities may occur would be at existing stationary sources and along transportation corridors. Stationary sources are generally located within commercial and industrial (urbanized) areas. Any related construction activities would be expected to be within the confines of the existing facilities and would not encroach into open space. The 2016 AQMP may also result in the construction of overhead catenary lines to electrify roadways and transportation corridors. These transportation measures are expected to use existing roadways and are not expected to require the development of new roads or freeways. Therefore, the 2016 AQMP would not result in development within or encroachment into an open space area.

4.10.1.4 Precedent Setting Action

The 2016 AQMP demonstrates attainment of the ozone and PM2.5 standards by applicable dates as required by the CAA. The federal CAA requires ozone and PM2.5 nonattainment areas to prepare a SIP which must be submitted to the U.S. EPA. Therefore, the 2016 AQMP is being prepared to comply with state and federal air quality planning regulations and requirements. These required approvals are routine compliance actions and would not result in precedent-setting actions that might cause other significant environmental impacts (other than those evaluated in other sections of this Program EIR).

4.10.1.5 Conclusion

The 2016 AQMP was developed to comply with state and federal air quality planning requirements for ozone and PM2.5. The 2016 AQMP is not expected to foster economic or population growth or result in the construction of additional housing or other infrastructure, either directly or indirectly, that would further encourage growth. The 2016 AQMP could result in construction projects at existing stationary sources and along existing transportation corridors. However, the proposed project would not be considered growth-inducing, because it would not result in an increase in production of resources or cause a progression of growth that could significantly affect the environment either individually or cumulatively, other than as evaluated in Chapters 4 and 5 of this Program EIR.

4.10.2 SIGNIFCANT ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

Section 15126.2 (b) of the CEQA Guidelines requires that an EIR describe significant environmental impacts that cannot be avoided, including those effects that can be mitigated but not reduced to a less than significant level. Irreversible changes include a large commitment of nonrenewable resources, committing future generations to specific uses of the environment (e.g., converting undeveloped land to urban uses), or enduring environmental damage due to an accident. The following is a summary of impacts associated with the 2016 AQMP that this Program EIR concluded are significant and unavoidable, even after mitigation.

- Air quality impacts associated with construction activities due to the implementation of the control measures in the 2016 AQMP were considered to be potentially significant.

- The 2016 AQMP could result in a substantial increase in electricity use (greater than one percent of the existing electricity use in the Basin), and the increased electricity demand is considered significant.

- The possibility exists that facilities currently using water-based products could switch to using reformulated solvent-based products made with acetone or other flammable or extremely flammable chemicals, resulting in a significant hazard impact.

- Hazard impacts associated with a tank rupture and the transportation of LNG were determined to be significant, and would remain significant after mitigation.

- The use of ammonia in SCR, SNCR, and DGS technologies could be potentially significant due to implementation of the control measures that would use aqueous ammonia. While the use of aqueous ammonia at concentrations less than 20 percent by volume is expected to reduce hazard impacts associated with ammonia use, the potential for an on-site spill of aqueous ammonia and an ammonia transportation accident would remain significant.

- Implementation of the 2016 AQMP is expected to result in an overall reduction in toxic emissions due to the toxic control measures. However, the location of the facilities that may use hazardous materials in unknown, therefore, hazard impacts associated with the handling of hazardous or acutely hazardous materials within one-quarter mile of an existing or proposed school is considered significant.

- Water demand associated with the manufacture and use of waterborne coatings, solvents, and other consumer products, and add-on air pollution control technologies such as wet ESPs and WGSs are considered significant.

- Noise and vibration impacts would be temporary in nature and related solely to construction activities, but are considered significant, even after mitigation.

- The extent and timing of construction needed to implement the 2016 AQMP is not known at this time, but the potential to exceed landfill capacities from construction waste was found to be significant. Additionally, the high volume of vehicle and equipment to retire in a short timeframe and uncertainty of their outcome would result in potential significant solid and hazardous waste impacts.

- Construction traffic impacts, though temporary in nature, are considered significant. The exclusive dedication of existing lanes of vehicle traffic travel as a truck lane for vehicles using the overhead catenary electrical lines or fixed guideway systems could lead to traffic congestion on those roadways and operational traffic impacts are considered significant.

- During construction, the equipment staging and laydown areas would be in close proximity to the location of the control measures and could create a temporary, but significant aesthetic impact due to the degradation of the existing visual character of the site. The installation of catenary lines and use of bonnet technology on ocean going vessels at the ports may substantially degrade the existing visual character or quality of a site and its surroundings and this impact is considered significant.

- The installation of solar panels and use of cool roof technology would create a significant source of glare.

Feasible mitigation measures were developed for the identified adverse significant impacts; however, those mitigation measures may not reduce the impacts to less than significant. The 2016 AQMP would place an incremental demand on nonrenewable and limited resources, such as energy and water supplies relative to the rate of use of these resources in response to population growth and increased consumer demand. The largely irretrievable conversion of undeveloped/agricultural land to urban uses is a function of the growing population and local land use authority, not the 2016 AQMP. The 2016 AQMP is expected to result in long-term benefits associated with achieving ambient air quality standards and a reduction in the use of petroleum-based fuels (e.g., increased use of alternative fuels).

Conversely, positive environmental changes are expected to result from implementation of the 2016 AQMP. The project will result in significantly reduced emissions of air pollutants, thereby improving air quality and related public health. Emission reductions will also directly improve the vitality of crops and other plants. The health of livestock, domestic animals and other wildlife will be indirectly enhanced by the positive effects on plant life, as well as by any direct benefits attributable to less air pollution. The damage to buildings and other structures attributable to air pollution also will be diminished, as well as an improvement in aesthetics and visibility.

4.10.3 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

An important consideration when analyzing the effects of a proposed project is whether it will result in short-term environmental benefits to the detriment of achieving long-term goals or maximizing productivity of these resources. Implementing the 2016 AQMP is not expected to achieve short-term goals at the expense of long-term environmental productivity or goal achievement. The purpose of the 2016 AQMP is to set forth a comprehensive control program that will lead the Basin into compliance with the federal ozone and PM2.5 air quality standards. By attaining federal and state air quality standards, the 2016 AQMP is expected to enhance short and long-term environmental productivity in the region.

Implementing the 2016 AQMP does not narrow the range of beneficial uses of the environment. Although significant impacts have been identified, implementation of the recommended mitigation measures will ensure such impacts are mitigated to the greatest degree feasible.

Because no short-term environmental benefits are expected at the expense of long-term environmental goals being achieved, there is no justification for delaying the proposed action. This project must be implemented now as the SCAQMD is required by the federal and state CAAs to formally review the 2016 AQMP and adopt relevant plan revisions which will achieve the state and federal ambient air quality standards by the established deadlines. The SCAQMD is proceeding with the 2016 AQMP pursuant to this mandate.

CHAPTER 5

CUMULATIVE IMPACTS

5.1 Introduction
5.2 Aesthetics
5.3 Agriculture and Forestry Resources
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5.0 CUMULATIVE IMPACTS

CEQA Guidelines §15130(a) requires an EIR to discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable, as defined in §15065(a)(3). The 2016 AQMP is a regional air quality plan that includes broad policy criteria and as such, the 2016 AQMP Program EIR evaluates the environmental impacts associated with implementing the 2016 AQMP control measures to determine whether or not the impacts of the project are cumulatively considerable when combined with potential impacts associated with other similar regional projects involving regulatory activities or other projects with similar impacts.

5.1 INTRODUCTION

As noted in Chapter 2, the 2016 AQMP control measures consist of three components: 1) the SCAQMD's Stationary and Mobile Source Control Measures; 2) State and Federal Mobile Source Control Measures; and 3) Regional Transportation Strategy and Control Measures provided by SCAG. The project-specific analysis of environmental impacts in Chapter 4 includes analysis of control measures proposed by the SCAQMD and CARB because these are primary regulatory agencies with jurisdiction over promulgating and enforcing air quality regulations. The cumulative impacts analysis for the 2016 AQMP Program EIR includes the project-specific analyses of the SCAQMD's stationary and mobile source control measures and CARB's mobile source control measures, as well as the transportation control measures (TCMs) that were developed and adopted by SCAG as part of the 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS)[1] and the 2015 Federal Transportation Improvement Program (FTIP) (SCAG 2016) (see Appendix IV-C of the 2016 AQMP). The TCMs are appropriately part of the cumulative impact analysis because they include regulatory activities associated with measures that could also generate related environmental impacts within the Basin. The basis for determining the appropriate scope of the cumulative impacts analysis for the 2016 AQMP is described in the following sections.

5.1.1 SCAG'S 2016 RTP/SCS

One of SCAG's primary responsibilities is fulfilling federal and state requirements that include the development of the RTP/SCS, the FTIP, and the annual Overall Work Program. SCAG's 2016 RTP/SCS is a long-range regional transportation plan that provides a vision for regional transportation investments, integrated with land use strategies, over the period from 2016 to 2040. In general, the long-term transportation planning requirements for emission reductions from on-road mobile sources within the Basin are met by SCAG's RTP/SCS, whereas the short-term implementation requirements of the Transportation Conformity Rule are met by SCAG's FTIP.

Some of the most important components of the 2016 RTP/SCS include: integrated land use and transportation strategies; a list of transportation projects; a description of regional growth trends that identify future needs for travel and goods movement; and a financial plan that identifies the

1 Under SB 375, SCAG addresses GHG reduction in a Sustainable Communities Strategy (SCS) as part of the Regional Transportation Plan. SB 375 was established to implement the state's GHG emissions reduction goals, as set forth by AB 32, in the sector of cars and light trucks. SCS is intended to provide a vision for future growth in Southern California that would decrease per capita GHG emissions from passenger vehicles.

amount of funding that is reasonably expected to be available to build, operate, and maintain the region's surface transportation system through the forecast horizon year of 2040. Because the 2016 RTP/SCS is a land use and transportation strategies program developed within SCAG's jurisdictional authority, it is considered to be a regional plan separate from the 2016 AQMP. However, part of SCAG's responsibilities include working with the SCAQMD to incorporate 2016 RTP/SCS TCMs into the region's air quality management plans.

In general, TCMs are those control measures that provide emission reductions from on-road mobile sources, based on changes in the patterns and modes by which the regional transportation system is used. The 2016 RTP/SCS includes a host of strategies for addressing growth, land use, and improving the regional transportation system, which are listed below.

Land Use Strategies:

- Focus new growth around transit/high quality transit areas (HQTAs)
- Plan for growth around livable corridors
- Provide more options for short trips/neighborhood mobility areas
- Support zero emission vehicles and expand electric vehicle charging stations
- Support local sustainability planning
- Protect natural and farm lands
- Balance growth distribution between 500-foot buffer areas and HQTAs

Transportation Strategies:

- Preserve the existing transportation system
- Manage congestion through Transportation Demand Management (TDM) and Transportation System Management (TSM)
- Expand Regional Transit Systems
- Expand passenger rail and maintain high speed rail commitments
- Promote active transportation
- Improve highway and arterial capacity
- Strengthen regional transportation network for goods movement
- Improve airport ground access

Strategies included within these transportation system improvements include TCMs grouped into the following three main categories of transportation improvement projects and programs: (1) Transit, intermodal transfer, and active transportation measures; (2) High occupancy vehicle (HOV) lanes, high occupancy toll (HOT) lanes, and their pricing alternatives; and (3) Information-based transportation strategies. Appendix IV-C of the 2016 AQMP includes a list of transportation control measure projects that are specifically identified and committed to in the 2016 AQMP.

SCAG's Regional Council approved the TCMs and strategies included in the 2016 RTP/SCS and certified the 2016 RTP/SCS Program EIR and the investment commitments contained in the 2015 FTIP and its subsequent amendments. These measures and recommendations have accordingly been moved forward for inclusion in the 2016 AQMP.

Because the TCMs and their emissions reductions are included along with the 2016 AQMP in the PM2.5 and Ozone SIP submittal for the Basin and because the TCMs and other projects in the

2016 RTP/SCS have the potential to generate impacts similar to those identified in the 2016 RTP/SCS Program EIR, the 2016 RTP/SCS is considered to be a cumulatively related project. The impacts of implementing these TCMs were already evaluated in the 2016 RTP/SCS Program EIR (SCAG, 2016). The cumulative analysis in this chapter relies in large part on the environmental analyses in the 2016 RTP/SCS Program EIR for the evaluation of the environmental impacts of implementing the TCMs.

5.1.2 CARB'S STATE SIP STRATEGY

As indicated above and in Chapter 2 of this Program EIR, the 2016 AQMP includes control measures to reduce emissions from sources that are primarily under state and federal jurisdiction, including on-road and off-road mobile sources that are proposed by, and the responsibility of CARB. These emission reductions, along with the emission reductions from SCAQMD and SCAG control measures, are needed to achieve the remaining emission reductions necessary for ozone and PM2.5 attainment. Statewide emission reduction control measures proposed by CARB are included in the Proposed 2016 State Strategy for the SIP (State SIP Strategy), which was released on May 17, 2016. The new measures contained in the State SIP Strategy reflect a combination of state actions, petitions for federal action, as well as actions that outline a pathway for achieving further deployment of the cleanest technologies in each sector. These measures, in conjunction with the SCAQMD's existing regulatory programs, identify all of the reductions needed to achieve a 70 percent reduction in NOx emissions from mobile sources in 2023, and an 80 percent reduction in 2031 in the Basin. The SCAQMD's existing regulatory programs are expected to aid in reducing NOx emissions from today's levels by 209 tons per day by 2031. As part of the proposed State SIP Strategy, CARB will provide an enforceable commitment to achieve an additional 107 tons per day of NOx reductions in 2023, and 97 tons per day in 2031. The State SIP Strategy will also provide 48 and 60 tons per day, respectively, of VOC reductions in 2023 and 2031 which provide supplemental benefits in reducing ozone in some portions of the Basin. Any additional commitments to address PM2.5 attainment needs in 2025 will be identified separately, if needed.

CARB's State SIP Strategy not only includes control measures applicable within the SCAQMD's area of jurisdiction, but it includes control measures applicable to the entire state of California. In particular, the State SIP Strategy also includes control measures specifically for the San Joaquin Valley Air Pollution Control District's area of jurisdiction because this area along with the Basin are the only two extreme ozone non-attainment areas in the nation with an attainment deadline of 2031. In addition, the State SIP Strategy specifically applies to the following four areas in California designated as nonattainment for the 12 μg/m3 annual PM2.5 standard: the Basin; the San Joaquin Valley; the border region of Imperial County; and the City of Portola in Plumas County. With regard to the Imperial County and Portola nonattainment areas, the State SIP Strategy includes separate, tailored control programs.

CARB prepared a Draft Environmental Analysis (EA) for the State SIP Strategy, which evaluated the project-specific and cumulative environmental effects of the State SIP Strategy control measures implemented throughout the state. As is appropriate under CEQA, CARB's Draft EA relies on a number of other CEQA documents to assist with identifying cumulative environmental impacts that may be generated by the State SIP Strategy and other potentially related programs. CEQA documents that CARB relied on for evaluating cumulative impacts of the State SIP Strategy include the following: the First Update to the Scoping Plan (adopted in 2014) and the 2030 Target Scoping Plan Update (currently in preparation), prepared in accordance with AB 32 (Statutes of 2006); the Low Carbon Fuel Standard and Alternative Diesel Fuel Commercialization Regulations; and RTP/SCSs prepared to comply with SB 375 (Statutes of 2008). With regard to the RTP/SCSs, in addition to relying on the Program EIR for SCAG's 2016 RTP/SCS[2], CARB's Draft EA relied on the CEQA documents for 16 other RTP/SCSs prepared throughout California. CARB is working on responses to comments received on the Draft EA and working on the Final EA, which is scheduled to be heard by the CARB Board on September 22, 2016.

It is appropriate that CARB's control measures be included as part of the analysis of project-specific impacts for the AQMPs. This approach has been done for the 2003, 2007, and 2012 AQMPs previously prepared and approved by both CARB and the SCAQMD. The 2016 AQMP Program EIR continues this strategy of evaluating the CARB SIP Strategy control measures as part of the 2016 AQMP. However, it is inappropriate to incorporate the cumulative impacts analysis from CARB's Draft EA into this Program EIR for the following reasons.

As already noted, the State SIP Strategy evaluated in CARB's Draft EA includes cumulative environmental impacts from control measures implemented throughout the state of California. Further, the cumulative impacts analysis relies on CEQA documents prepared for RTP/SCSs in areas such as Madera, Fresno, Tulare, San Jose, Sacramento, etc., that are located in areas distant from the Basin. Although implementing State SIP Strategy control measures in these other areas may produce impacts similar to those identified for the 2016 AQMP, it is unlikely that environmental impacts from the 2016 AQMP will influence or be influenced by environmental impacts in these other areas. The CEQA Guidelines define cumulative impacts as, "two or more individual effects which, when considered together, are considerable or which **compound or increase other environmental impacts.**" (Emphasis added) (CEQA Guidelines §15355). Further, the CEQA Guidelines also consider location when determining cumulatively related projects. As noted in CEQA Guidelines §15130(b)(2), factors to consider when determining whether to include a related project in the cumulative analysis include the nature of each environmental resource being examined and the location of the project. Further, "location may be important, for example, when water quality impacts are at issue since projects outside the watershed would probably not contribute to a cumulative effect." Clearly projects in the other areas evaluated in CARB's Draft EA are outside the area of influence of potential impacts generated by the 2016 AQMP. To include cumulative impacts from the areas that do not influence or are not influenced by the 2016 AQMP into the cumulative analysis is inconsistent with requirements in the CEQA Guidelines. Therefore, the cumulative impacts analyses from CARB's Draft EA are not included in the analysis of cumulative impacts from the 2016 AQMP and SCAG's 2016 RTP/SCS.

5.1.3 RELATED PROJECTS FOR THE CUMULATIVE ANALYSIS

The following sections summarize the project-specific and cumulative impacts analyses from the Final Program EIR for the 2016 RTP/SCS. The discussions also summarize project-specific

[2] Review of CARB's summary of impacts from SCAG's 2016-2040 RTP/SCS, included in the Draft EA (see Draft EA Table 5.3), indicates that some of the significance determinations in the Draft EA are inconsistent with the significance determinations in SCAG's 2016-2040 RTP/SCS Final Program EIR.

impacts from the 2016 AQMP, which includes both SCAQMD control measures as well as control measures included in CARB's State SIP Strategy. The discussions also include an evaluation regarding whether or not impacts from the 2016 AQMP contribute to cumulative impacts from the 2016 RTP/SCS, which have already been evaluated in the 2016 RTP/SCS Program EIR certified by SCAG (SCAG, 2016).

5.2 AESTHETICS

5.2.1 CUMULATIVE IMPACTS

The 2016 AQMP control measures are expected to have a less than significant impact on scenic resources such as scenic vistas and scenic highways. The proposed control measures would typically affect industrial, institutional, or commercial facilities located in appropriately zoned areas (e.g., industrial and commercial areas), which are not typically associated with scenic resources. Furthermore, modifications would typically take place inside the affected facilities or can easily blend with the facilities with little or no noticeable effect on adjacent areas due to the nature of the business (e.g. industrial or commercial). During construction, the equipment staging and laydown areas would be in close proximity to the each affected site and could create a temporary, but potentially significant aesthetic impact due to the degradation of the existing visual character of the each affected sites. Mobile source control measures are not expected to adversely affect scenic resources because they do not require construction or disturbance to such resources. Although, proposed zero and near-zero emissions control measures (e.g. increased penetration of near-zero and zero emission vehicles) that could result in the installation of catenary lines (overhead power lines) are expected to be located in industrial and commercial areas or along existing high activity transportation corridors (e.g. in areas within and adjacent to the Ports of Los Angeles and Long Beach), which are not in areas with officially designated scenic highways, it is possible that the existing visual character of the site and its surroundings could be significantly impacted. The use of control devices such as bonnet technology to reduce emission from ocean going vessels could also degrade the visual character of a site. The addition of solar panels on residences could introduce a new source of glare; therefore, this impact was determined to be significant.

According to the 2016 RTP/SCS Program EIR, implementation of the 2016 RTP/SCS would adversely affect aesthetics and views. Expected significant impacts would include the obstruction of scenic views and vista points due to the construction of highways, connectors, interchanges, goods movement roadway facilities, high speed rail, and sound walls for anticipated RTP/SCS transportation projects, which would potentially block or impede views of mountains, oceans, or rivers. Development in floodplains, wetlands, wooded areas, coastal bluffs, lagoons, reservoirs, regional parks, recreational areas, agricultural lands, or in areas that include steep slopes or scenic vistas has the potential to adversely impact visual resources

In addition, implementation of the 2016 RTP/SCS would alter areas along state designated scenic highways and vista points, in particular along SR-74 in Riverside County, I-10 in San Bernardino County, the SR-57/SR-60 Interchange improvement in Los Angeles County, and the High Desert Corridor Project could obstruct scenic resources. Rail projects such as the Slauson Light Rail and Gold Line Extensions (from Azusa to the San Bernardino County line) could also obstruct scenic views. Due to the large number of transportation projects and potential development influenced by land use strategies, it is expected that new and expanded highway and roadway facilities, new and expanded transit projects, and new and expanded goods movement projects could result in significant impacts to vistas of scenic resources in the region and also have the potential to result in changes to visual character of existing landscapes or natural areas.

The proposed transportation projects included in the 2016 RTP/SCS would have the potential to create a new source of substantial light or glare which would adversely affect day or nighttime views and expanded areas of shade and shadow in jurisdictions where there are no ordinances protecting night skies or local standards protecting shadow-sensitive land uses. These impacts are potentially significant and mitigation measures were imposed.

Because implementation of the 2016 RTP/SCS would include the extension of transportation and related infrastructure to areas outside the region and, as such, would indirectly result in changes to the visual character or to scenic areas outside of the SCAG region, the 2016 RTP/SCS would contribute to a cumulatively considerable loss of scenic resources.

Impacts from implementation of the 2016 AQMP to aesthetic resources were determined to generate significant adverse aesthetic impacts. Therefore, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to aesthetic resources identified in the 2016 RTP/SCS.

5.2.2 MITIGATION MEASURES

No additional mitigation measures to reduce the significant cumulative impacts to aesthetics have been identified.

5.2.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative impacts to aesthetics from implementation of the 2016 AQMP would remain significant and unavoidable.

5.3 AGRICULTURE AND FORESTRY RESOURCES

5.3.1 CUMULATIVE IMPACTS

Impacts to agriculture and forestry resources were considered and fully evaluated in the Notice of Preparation/Initial Study (NOP/IS, Appendix A) prepared for the 2016 AQMP. As concluded in the NOP/IS, implementation of the 2016 AQMP is not expected to result in significant adverse impacts to agriculture and forestry resources. Implementation of the 2016 AQMP control measures are not expected to result in any new construction of buildings or other structures that would require conversion of farmland to non-agricultural use or conflict with zoning for agricultural uses or a Williamson Act contract. Further, the proposed control measures would typically affect existing facilities that are located in appropriately zoned areas. Any new facilities that may be affected by AQMP control measures would be constructed and operated for reasons other than complying with the control measures. Therefore, it is not expected that implementation of the 2016 AQMP control measures would conflict with any forest land zoning codes or convert forest land to non-forest uses.

The 2016 RTP/SCS includes transportation projects and strategies that would have the potential to convert Prime Farmland, Farmland of Statewide Importance, and Unique Farmland in all six counties and affect Local Farmland and Grazing land in five of the six counties because these important farmlands are located in the vicinity (within a worst-case-scenario 500-foot construction radius) of the transportation projects in the Plan, constituting a significant impact when taken into consideration with other infrastructure and development project in the SCAG region and surrounding areas. In addition, the loss of forest land in patches near the wildland-urban interface as a result of transportation projects was analyzed in the 2016 RTP/SCS.

For the 2016 AQMP, impacts to agriculture and forestry resources were determined to be below the level of significance in the NOP/IS. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulatively considerable impacts to agricultural resources identified in the 2016 RTP/SCS because potential agriculture and forestry resource impacts identified in the 2016 RTP/SCS Program EIR are different than the potential agricultural impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect agricultural resources impacted by the 2016 RTP/SCS.

5.3.2 MITIGATION MEASURES

Since the 2016 AQMP would not result in cumulatively significant impacts to agriculture and forestry resources, no further mitigation is necessary.

5.3.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative agriculture and forestry resource impacts from implementation of the 2016 AQMP would remain less than significant.

5.4 AIR QUALITY AND GREENHOUSE GASES

5.4.1 CUMULATIVE IMPACTS

Construction Impacts: Implementation of the 2016 AQMP is expected to result in significant adverse construction air quality impacts because emissions from construction of 2016 AQMP control measures have the potential to exceed the SCAQMD's CEQA significance thresholds. Mitigation measures were identified, but air quality impacts from construction would remain significant.

According to the 2016 RTP/SCS Program EIR, implementation of the 2016 RTP/SCS transportation and development projects would result in substantial construction activities. The construction activities would create short-term temporary emissions from the following activities:

(1) demolition; (2) site preparation activities (grading/excavation); (3) fuel combustion from operation of construction equipment; (4) application of paints, coatings, and paving materials; (5) delivery and hauling of construction materials and supplies to and from sites; and (6) travel by construction workers to and from sites.

Operational Impacts – Criteria Pollutants: The 2016 AQMP is expected to result in emissions reductions in NOx, VOC, SOx, and PM emissions, providing an air quality benefit. As shown in Figure 4.1-3, the federal annual PM2.5 standards are predicted to be achieved in 2023 with implementation of the proposed ozone strategy and the California annual PM2.5 standard will be achieved in 2025 (see Figure 4.1-3). The 2016 AQMP is also expected to achieve the ozone 8-hour standard by 2023. Preliminary analysis suggests additional emission reductions beyond the level required in 2031 are needed to meet the 70 ppb ozone standard (see Figure 4.1-4).

Although existing and future air quality rules and regulations are expected to minimize emissions associated with increased generation of electricity, the 2016 AQMP will result in a substantial increase in electricity generation. The electricity providers have committed to meeting the increased energy demand and the emissions from the generation of this increase demand has been included in the emission inventory of the 2016 AQMP. No significant air quality impacts from control of stationary sources were identified associated with implementation of the 2016 AQMP. Several control measures would reduce VOC emissions associated with reformulated products. The air quality impacts from implementing reformulated products would result in an overall reduction of VOC emissions. Control measures in the 2016 AQMP would also reduce emissions from mobile sources by accelerating the penetration of partial zero-emission and zero emission vehicles and other mobile sources. Additionally, the air quality impacts from miscellaneous source control measures were concluded to be less than significant. Therefore, operational air quality impacts are less than significant.

Under the 2016 RTP/SCS, mobile source criteria pollutants are expected to have a short term increase during construction activities, but long term air quality impacts are expected to remain the same or decrease compared to baseline (2012) levels.

Operational Impacts – TACs: Control measure CMB-05 may result in the use of ammonia in SCRs and SNCRs. BACT (i.e. catalyst) for ammonia slip from SCR units is restricted to five ppm or less, which has been shown through source-specific permit modeling to have no significant impact on surrounding communities. Implementation of the 2016 AQMP is expected to result in an overall reduction in TAC emissions as there are a number of measures to reduce TAC emissions. The 2016 AQMP would also accelerate the penetration of partial-zero and zero emission vehicles and other mobile sources, reducing the use of conventional fuels and the related air emissions, which include TACs (such as DPM). Therefore, implementing 2016 AQMP control measures is not expected to generate significant adverse air quality impacts from increased exposure to TAC emissions.

Under the 2016 RTP/SCS, the maximum cancer potential is less than existing conditions even though vehicle miles traveled (VMT) is expected to increase. However, despite an overall cancer risk reduction, minor exposure of sensitive receptors to pollutants exceeds the cancer risk threshold, mainly around areas of high traffic volume areas such as freeways, which was deemed to be significant. A focus on creating more high quality transit areas (HQTAs) is expected to further reduce public health risks by promoting an increase in active transportation (e.g. biking and walking) which in turn contributes to pollutant level reductions.

Greenhouse Gas Emissions: Electricity is expected to be the predominant alternative fuel because it is more available, affordable, and can be used to power zero emission vehicles. As a result, GHG emissions associated with the use of alternative fuels are expected to be less than GHG emissions associated with the use of petroleum-based fuels. Therefore, no increase in GHG emissions is expected from the increased production and use of alternative fuels and GHG emission impacts are expected to be less than significant. . Existing power generating facilities are subject to AB-32 and will be required to reduce GHG emissions by 2020 and any future power generating stations would be subject to stringent emission control requirements, including GHG emissions. Therefore, the need for additional electricity generation in order to provide power to operate the projected add-on control devices and catenary systems is not expected to generate significant adverse GHG emissions, after taking into account the reductions expected to result from the decreased use of gasoline and diesel fuels.

According to the 2016 RTP/SCS Program EIR, implementation of the 2016 RTP/SCS projects would result in a 24 percent decrease in GHG emissions by 2040 for both mobile source and residential/commercial buildings compared to emissions in the 2012 base year. The 2016 RTP/SCS meets or exceeds emission reduction targets for cars and light duty trucks set forth by SB375, and as such would result in a less than significant impact related to per capita emissions and SB375. Additionally, the 2016 RTP/SCS is expected to comply with reduction targets outlined in AB32 as the 2016 RTP/SCS contributes its reductions share for responsible sectors. However, there are potential significant GHG impacts if other responsible agency implementation activities do not achieve their respective GHG emission reduction goals to the appropriate level.

The 2016 AQMP control measures would result in significant adverse air quality impacts during construction and when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to air quality identified in the 2016 RTP/SCS. Therefore, resulting in a significant cumulative impact.

5.4.2 MITIGATION MEASURES

No additional mitigation measures to reduce the significant cumulative impacts to air quality have been identified.

5.4.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative impacts to air quality from implementation of the 2016 AQMP would remain significant and unavoidable.

5.5 BIOLOGICAL RESOURCES

5.5.1 CUMULATIVE IMPACTS

Impacts to biological resources were considered and fully evaluated in the NOP/IS (Appendix A) prepared for the 2016 AQMP. As concluded in the NOP/IS, implementation of the 2016 AQMP is not expected to result in significant adverse impacts to biological resources because the 2016 AQMP control measures typically affect existing commercial or industrial facilities or establish specifications for fuels or mobile source exhaust emissions and as such are not expected to generate new construction of buildings or other structures that in areas with species identified as a candidate, sensitive, or special status species in local, or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.

Transportation projects, and anticipated development projects resulting from the land use strategies, included in the 2016 RTP/SCS would result in substantial adverse effects to threatened and/or endangered species, fully protected and sensitive species, locally important species, or associated critical habitat through conversion of natural habitats capable of sustaining these species to development, constituting a significant impact. However, regional land use strategies set forth in the Plan include conversation of natural habitats capable of sustaining listed and sensitive species to development by including land use strategies that focus new growth in high quality transit areas (HQTAs), existing suburban town centers, and more walkable, mixed-use communities and support redirecting growth away from high value habitat areas to existing urbanized areas. The level of impacts to threatened and/or endangered species, fully protected and sensitive species, locally important species, or associated critical habitat will vary on a project-by-project basis.

Across the six counties and 191 cities within the SCAG region, there are records of and/or habitat for 66 federally or state-listed wildlife species and 76 federally or state-listed plant species, 208 sensitive wildlife species, 426 rare and locally important plant species, and nearly 6 million acres of designated critical habitat for 29 federally listed species. The development of transportation improvement projects, particularly projects involving large-scale ground disturbance during construction such as grade separation projects, mixed flow lane projects, and rail projects, within the SCAG region may result in significant impacts to these species and their habitats. Because implementation of 2016 RTP/SCS projects would cause loss of habitat as well as habitat fragmentation in habitat corridors that cross the SCAG region's boundaries, thereby limiting the movement of wildlife species beyond the SCAG region, the 2016 RTP/SCS Program EIR determined that implementation of the 2016 RTP/SCS would contribute to a cumulative biological resources impact.

For the 2016 AQMP, impacts to biological resources were determined to be below the level of significance in the NOP/IS and the 2016 AQMP control measures would not generate significant adverse biological resources impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulatively considerable impacts to biological resources identified in the 2016 RTP/SCS because the potential biological resources impacts identified in the 2016 RTP/SCS Program EIR are different than the potential biological impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect biological resources impacted by the 2016 RTP/SCS.

5.5.2 MITIGATION MEASURES

Since the 2016 AQMP would not result in cumulatively significant impacts to biological resources, no further mitigation is necessary.

5.5.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative biological resources impacts from implementation of the 2016 AQMP would remain less than significant.

5.6 CULTURAL RESOURCES

5.6.1 CUMULATIVE IMPACTS

Impacts to cultural resources were considered and fully evaluated in the NOP/IS (Appendix A) prepared for the 2016 AQMP. As concluded in the NOP/IS, implementation of the 2016 AQMP is not expected to result in significant adverse impacts to cultural resources. The 2016 AQMP control measures typically affect existing facilities which would not require extensive cut-and-fill activities or excavation at undeveloped sites, and implementation of the 2016 AQMP would therefore not adversely affect historical or archaeological resources as defined in CEQA Guidelines §15064.5, destroy unique paleontological resources or unique geologic features, or disturb human remains interred outside formal cemeteries.

In a small number of cases, implementation of the 2016 AQMP may require minor site preparation and grading at an affected facility. Under this circumstance, it is possible that archaeological or paleontological resources could be uncovered. Even if this circumstance were to occur, significant adverse cultural resources impacts are not anticipated because construction activities would occur at previously disturbed industrial or commercial locations and there are existing laws in place that are designed to protect and mitigate potential adverse impacts to cultural resources. As with any construction activity, should archaeological resources be found during construction that result from implementation of the 2016 AQMP, the activity would cease until a thorough archaeological assessment is conducted and the Native American Heritage Commission (NAHC) is contacted, if necessary.

According to the 2016 RTP/SCS Program EIR, over 32,000 archaeological and historic locations have been identified in the SCAG region. Each of these sites is documented at the Office of Historic Preservation, which holds location information on archaeological sites for each region in California. Paleontological sites are also numerous in southern California. The development of new transportation facilities as part of the 2016 RTP/SCS may affect historical resources because many HQTAs would be located in older urban centers where structures of architectural or historical significance are likely to be located. In addition, 2016 RTP/SCS transportation projects would significantly affect archaeological and paleontological resources because the projects could be located in previously undisturbed areas. Furthermore, since it is not always possible to predict where human remains may occur outside of formal burials, it is possible that excavation and construction activities associated with 2016 RTP/SCS projects may disturb previously undiscovered human remains not interred in marked, formal burials, resulting in significant impacts.

Finally, the 2016 RTP/SCS's influence on growth would contribute to regional impacts on existing and previously undisturbed and undiscovered cultural resources; impacts would combine with impacts in other areas of Southern California to contribute to a cumulative loss of cultural resources in California.

Impacts to cultural resources were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse cultural impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulatively considerable impacts to cultural resources identified in the 2016 RTP/SCS because any such impact would be extremely unlikely given the required procedures in place and the fact that the 2016 AQMP projects would be located on previously disturbed land (existing, developed facilities).

5.6.2 MITIGATION MEASURES

Since the 2016 AQMP would not result in cumulatively significant impacts to cultural resources, no further mitigation is necessary.

5.6.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative cultural resources impacts from implementation of the 2016 AQMP would remain less than significant.

5.7. ENERGY

5.7.1 CUMULATIVE IMPACTS

The 2016 AQMP could result in significant adverse electricity consumption impacts because the potential electricity usage increase would exceed baseline electricity consumption by 7.8 to 12.7 percent. No significant impacts on natural gas supplies and petroleum fuels associated with the 2016 AQMP were identified because of the anticipated reduction in future demand and wide availability of natural gas. Additionally, potential alternative energy demand impacts are expected to be less than significant as adequate supplies are available.

The 2016 RTP/SCS Program EIR concluded that overall energy demand would increase as a result of implementation of the 2016 RTP/SCS. Under the 2016 RTP/SCS, the regional transportation system has the potential to increase petroleum and non-renewable fuel consumption but the increase in active transportation, the encouragement of carpooling and transit use, and better fuel economy would result in less transportation related fuel consumption. Despite an expected per capita decrease in energy consumption, overall residential and commercial building energy consumption would increase due to a growth in the population and an increased number of households and the impact expected to be significant.

The 2016 AQMP control measures would result in significant adverse energy demand impacts and when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to energy identified in the 2016 RTP/SCS, therefore resulting in a significant cumulative impact.

5.7.2 MITIGATION MEASURES

No additional mitigation measures to reduce the significant cumulative impacts to energy have been identified.

5.7.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative impacts to energy from implementation of the 2016 AQMP would remain significant and unavoidable.

5.8 GEOLOGY AND SOILS

5.8.1 CUMULATIVE IMPACTS

Impacts to geologic resources were considered and fully evaluated in the NOP/IS (Appendix A) prepared for the 2016 AQMP. As determined in the NOP/IS, implementation of the 2016 AQMP would typically affect existing facilities which would not require extensive cut-and-fill activities or excavation at undeveloped sites, and therefore would not adversely expose people or structures to earthquake faults, seismic shaking, seismic-related ground failure including liquefaction, landslides, mudslides or substantial soil erosion. Although some structural modifications at existing affected facilities may occur as a result of installing control equipment or making process modifications, existing affected facilities or modifications to existing facilities would be required to comply with relevant California Building Code requirements in effect at the time of initial construction or modification of a structure which are expected to mitigate geology and soils impacts to less than significant.

All of southern California is susceptible to impacts from seismic activity and numerous active faults are known to exist in the region that could potentially generate seismic events capable of significantly affecting transportation facilities proposed in the 2016 RTP/SCS. According to the 2016 RTP/SCS Program EIR, seismic events could damage transportation infrastructure through surface rupture, ground shaking, liquefaction, and landsliding. New transportation infrastructure and facilities associated with implementation of transportation projects included in the 2016 RTP/SCS could expose additional people and infrastructure to the effects of earthquakes and seismically-induced landslides. Similarly, the 2016 RTP/SCS includes a set of regional land use strategies that are intended to guide future land development patterns to focus new growth in HQTAs, existing suburban town centers, and walkable mixed-use communities. While the specific impact of this pattern of development relative to seismic risk is unknown, it could result in more people being exposed to the effects of earthquakes and seismically induced landslides. The 2016 RTP/SCS Program EIR also determined that seismically induced tsunami and seiche waves could damage transportation infrastructure proximate to coastal areas, but that the potential for these impacts would be remote and was not considered significant.

The 2016 RTP/SCS Program EIR concluded that earthwork associated with implementation of the 2016 RTP/SCS could result in soil erosion and/or loss of topsoil and in some cases could result in slope failure. The 2016 RTP/SCS Program EIR further determined that location of 2016 RTP/SCS projects on expansive soils and unstable geologic units could have potentially significant impacts to property and public safety due to on- or off-site landslides, lateral spreading, subsidence, liquefaction or collapse. Finally, the 2016 RTP/SCS Program EIR concluded that implementation of the 2016 RTP/SCS would occur within the SCAG region, would be site-specific in nature and as such would not contribute to a cumulatively considerable increase in risk associated with geologic hazards.

For the 2016 AQMP, impacts to geology and soils were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse geology and soil impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulatively considerable impacts to geology and soil resources identified in the 2016 RTP/SCS because potential geology and soil impacts identified in the 2016 RTP/SCS Program EIR are different than the potential geology and soil impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect geology and soils impacted by the 2016 RTP/SCS.

5.8.2 MITIGATION MEASURES

Since the 2016 AQMP would not result in cumulatively significant impacts to geology and soils, no further mitigation is necessary.

5.8.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative geology and soils impacts from implementation of the 2016 AQMP would remain less than significant.

5.9 HAZARDS AND HAZARDOUS MATERIALS

5.9.1 CUMULATIVE IMPACTS

The fire hazard impacts associated with reformulated coatings, solvents, and consumer products in the 2016 AQMP are expected to be significant, as more flammable materials may be used. The SCAQMD cannot predict which coatings, solvents, adhesives, and sealants each affected facility might choose to use in the future as reformulated products become available or estimate the amount of coatings to be used. Mitigation measures were crafted to inform consumers about any potential fire hazards that may be associated with those reformulated products that may have increased flammability. While the promotion of consumer awareness may be helpful for safety reasons, these mitigation measures do not physically reduce any fire hazards in the reformulated products themselves. Thus, the fire hazards impacts are expected to remain significant.

The impacts from tank rupture of LNG and ammonia (in the non-refinery sector), and transport of LNG and ammonia are expected to remain significant even after implementation of mitigation.

In addition to the federal, state, and local regulations that facilities and sites listed on lists pursuant to Government Code §65962.5 must comply with, implementation of mitigation measures will reduce the impacts to less than significant.

Implementation of the 2016 AQMP is expected to result in an overall reduction in toxic emissions due to the toxic control measures. Nevertheless, hazard impact associated with implementation of the 2016 AQMP control measures could result in potentially significant hazard impacts at sensitive receptors, including existing and proposed school sites. The location of the facilities that may use hazardous materials as a result of the 2016 AQMP control measures is currently unknown. While mitigation measures would reduce the potentially significant hazard impacts and additional mitigation measures may be available on a site-specific basis (e.g., containment facilities, appropriate placement of tanks, etc.), the potential hazard impacts associated with the handling of hazardous or acutely hazardous materials within one-quarter mile of an existing or proposed school site remain significant.

According to the 2016 RTP/SCS Program EIR, proposed freight rail enhancements and other goods movement capacity enhancements could result in increased or new transport of hazardous materials or wastes. In additions, construction and maintenance of such projects would result in use of equipment that contains or uses routine hazardous materials (e.g. diesel-fuel, paint and cleaning solutions), and the transportation of excavated soil and/or groundwater containing contaminants from previously contaminated areas. The 2016 RTP/SCS Program EIR concluded that although individual projects would be required to comply with all existing regulations, due to the volume of projects contained within the RTP/SCS it is possible that significant impacts would occur.

Because implementing the 2016 RTP/SCS would facilitate the movement of goods, including hazardous materials, through the region, transportation of goods, in general, and hazardous materials in particular, is expected to increase substantially with implementation of the 2016 RTP/SCS. The 2016 RTP/SCS Program EIR estimated that port traffic would triple from about 14 million Twenty-foot Equivalent Units (TEUs) in 2015 to 43 million TEUs in 2040. The 2016 RTP/SCS Program EIR concluded that there would be a potential to create a hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment during transportation. The 2016 RTP/SCS Program EIR also concluded that approximately 541 existing kindergarten through 12th grade school would be located within a one-quarter mile buffer of the 2016 RTP/SCS projects and as such could be impacted by an accidental release of hazardous materials.

Furthermore, implementation of the 2016 RTP/SCS could potentially take place on sites which are included on a list of hazardous material sites and as such potentially disturb contaminated property during construction activities. The 2016 RTP/SCS also has the potential to impair or interfere with emergency response procedures and emergency evacuation plans due to roadway closures and congestion as a result of construction. There is the potential for the 2016 RTP/SCS to expose people to significant impacts from wildland fires due to possible development in areas with a high fire hazard risk. Finally, the 2016 RTP/SCS Program EIR concluded that the forecasted urban development and growth that would occur under the 2016 RTP/SCS and the increased mobility provided by the 2016 RTP/SCS would result in increased hazardous materials transport outside of the SCAG region and as such would contribute to cumulatively considerable hazard impacts.

The 2016 AQMP control measures would result in significant adverse hazards and hazardous waste impacts and when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to hazards and hazardous waste identified in the 2016 RTP/SCS, therefore resulting in a significant cumulative impact.

5.9.2 MITIGATION MEASURES

No additional mitigation measures to reduce the significant cumulative impacts to hazards and hazardous materials have been identified.

5.9.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative impacts to hazards and hazardous materials from implementation of the 2016 AQMP would remain significant and unavoidable.

5.10 HYDROLOGY AND WATER QUALITY

5.10.1 CUMULATIVE IMPACTS

Wastewater treatment facilities are expected to have sufficient capacity to handle the estimated increase in wastewater that could be associated with 2016 AQMP control measures generated from reformulation of products and use of air pollution control equipment (e.g., wet ESPs and WGSs). Therefore, less than significant impacts associated with wastewater treatment or water quality would be expected. Implementation of 2016 AQMP control measures would not be expected to result in greater adverse water quality impacts from the use of alternative fuels than the use of conventional fuels and impacts would be less than significant. Less than significant adverse water quality impacts are expected from the increased use of EV and hybrid vehicles and the associated increase in battery use and disposal. Furthermore, the increased use of SBS was also concluded to have less than significant hydrology and water quality impacts.

The water demand associated with certain air pollution control technologies the use of waterborne coatings could exceed the significance threshold of 262,820 gallons per day for potable water demand and five million gallons per day of total water demand. Thus, the overall water demand from implementing the 2016 AQMP is concluded to have significant hydrology (water demand) impacts. The source of water to meet the projected demand will vary from jurisdiction to jurisdiction but can include additional use of ground water and recycled water resources. Most of the ground water basins used for water supply are managed to minimize and prevent overdraft conditions.

The increased water demand is expected to be associated with existing sources within the Basin which already have water conveyance infrastructure. Therefore, the construction of new water conveyance infrastructure is not expected to be required.

According to the 2016 RTP/SCS Program EIR, general program level impacts from new transportation projects proposed in the 2016 RTP/SCS would degrade local surface water quality by increased roadway and urban runoff, potentially violating water quality standards associated with wastewater and storm water. In addition, the 2016 RTP/SCS could alter existing drainage patterns in such a way as to result in substantial erosion or siltation.

Implementation of the 2016 RTP/SCS would also increase impervious surfaces due to construction of additional miles of roadway, in addition to urban development associated with the increase in population expected by 2040, and as such, would increase runoff and potentially affect groundwater recharge rates. Furthermore, the 2016 RTP/SCS could potentially increase flooding hazards by placing structures within 100-year flood hazard areas and increase the rate or amount of surface runoff in a manner that would result in flooding or produce or contribute runoff water that would exceed the capacity of existing or planned storm water drainage systems on-site or off-site.

The 2016 RTP/SCS transportation projects and growth in urbanized areas would increase impervious areas which will generate additional runoff water that in turn has the potential to degrade the water quality of the receiving waters. The 2016 RTP/SCS also has the potential to expose people to the effects of levee or dam failure due to projects that are located downstream from these types of infrastructure. Inundation by seiche, tsunami, and mudflow is also a potential significant impact due to the 2016 RTP/SCS taking place in a seismically active region with a history of subsidence and because of the nature of ground disturbing construction activities.

The 2016 AQMP control measures would result in significant adverse water demand impacts and when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to hydrology and water quality identified in the 2016 RTP/SCS. Therefore, resulting in a significant cumulative impact.

5.10.2 MITIGATION MEASURES

No additional mitigation measures to reduce the significant cumulative impacts to hydrology and water quality have been identified.

5.10.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative impacts to hydrology and water quality from implementation of the 2016 AQMP would remain significant and unavoidable.

5.11 LAND USE AND PLANNING

5.11.1 CUMULATIVE IMPACTS

Impacts to land use and planning were considered and fully evaluated in the NOP/IS prepared for the 2016 AQMP. As concluded in the NOP/IS, implementation of the 2016 AQMP is not expected to result in significant adverse impacts to land use and planning because the 2016 AQMP control measures typically affect existing commercial or industrial facilities or establish specifications for fuels or mobile source exhaust emissions and as such are not expected to generate new construction of buildings or other structures that would require any changes to existing land use plans, policies, or regulations.

It should be noted that there are no provisions of the 2016 AQMP that would directly affect land use plans, policies, or regulations. The SCAQMD is specifically precluded from infringing on existing city or county land use authority (California Health & Safety Code §40414). Land use and other planning considerations are determined by local governments and no present or planned land uses in the region or planning requirements would be altered by the 2016 AQMP.

Land use and planning were considered in the 2016 RTP/SCS Program EIR. According to the 2016 RTP/SCS Program EIR, implementation of the 2016 RTP/SCS would result in inconsistencies with general plans, disruption or division of established communities, changes to land uses by changing concentrations of development throughout SCAG, change patterns of growth and urbanization beyond the SCAG region, and cumulatively considerable changes to land use and the intensity of land use. Short-term construction related impacts and long-term or permanent displacement or offsite impacts from new facilities would potentially occur as a result of implementation of the 2016 RTP/SCS.

For the 2016 AQMP, impacts to land use and planning were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse land use and planning impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulatively considerable impacts to land use and planning identified in the 2016 RTP/SCS because potential land use and planning impacts identified in the 2016 RTP/SCS Program EIR are different than the potential land use and planning impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect land use and planning impacted by the 2016 RTP/SCS.

5.11.2 MITIGATION MEASURES

Since the 2016 AQMP would not result in cumulatively significant impacts to land use and planning, no further mitigation is necessary.

5.11.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative land use and planning impacts from implementation of the 2016 AQMP would remain less than significant.

5.12 MINERAL RESOURCES

5.12.1 CUMULATIVE IMPACTS

Impacts to mineral resources were considered and fully evaluated in the NOP/IS prepared for the 2016 AQMP. As concluded in the NOP/IS, implementation of the 2016 AQMP is not expected to result in significant adverse impacts to mineral resources. There are no provisions in the 2016 AQMP that would result in the loss of availability of a known mineral resource of value to the region and the residents of the state, or of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan. Some examples of mineral resources are gravel, asphalt, bauxite, and gypsum, which are commonly used for construction activities or industrial processes. The 2016 AQMP provides incentives for the penetration of zero and near-zero emission technologies which are not expected to result in an increase in the use of mineral resources. The proposed project is not expected to require substantial construction activities and would not have any significant effects on the use of important minerals, such as those described above (with the exception of the use of a minimal amount of gravel and asphalt for limited paving activities), nor would the project result in covering over or otherwise making mineral resources unrecoverable. Therefore, no new demand for mineral resources is expected to occur and no significant adverse mineral resources impacts from implementing the proposed project are anticipated.

According to the 2016 RTP/SCS Program EIR, implementing the proposed 2016 RTP/SCS transportation projects would result in the loss of availability of known aggregate and mineral resources that would be of value to the region. Transportation projects as well as development patterns influenced by land use strategies identified in the 2016 RTP/SCS would require substantial amounts of aggregate resources to construct, constituting a significant impact. The six-county and 191-city SCAG region has approximately 1,446 million tons of permitted aggregate reserves. The CGS estimates that the SCAG region would need approximately 4,728 million tons of aggregate over the next 50 years. The difference of 3,282 million tons would need to be permitted over the next 50 years to meet the projected demand. The 2016 RTP/SCS Program EIR also indicates that, of the eight areas of permitted aggregate resources, six have a minimum of 10 to 11 projected years remaining, and two have a minimum of 21 projected years remaining. The SCAG region's construction industry is greatly dependent on readily available aggregate deposits that are within a reasonable distance to market regions. Aggregate is a low-unit-value, high-bulk-weight commodity or material required for construction of most transportation projects and development projects that must be obtained from nearby sources in order to minimize costs to the consumer. If nearby sources do not exist, then transportation costs quickly could exceed the value of the aggregate.

For the 2016 AQMP, impacts to mineral resources were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse mineral impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulatively considerable impacts to mineral resources identified in the 2016 RTP/SCS because potential mineral resources impacts identified in the 2016 RTP/SCS Program EIR are different than the potential mineral impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect mineral resources impacted by the 2016 RTP/SCS.

5.12.2 MITIGATION MEASURES

Since the 2016 AQMP would not result in cumulatively significant impacts to mineral resources, no further mitigation is necessary.

5.12.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative mineral resources impacts from implementation of the 2016 AQMP would remain less than significant.

5.13 NOISE

5.13.1 CUMULATIVE IMPACTS

Construction Impacts: Although implementation of the 2016 AQMP control measures associated with air pollution control technologies and exhaust standards would not typically result in significant noise and vibration impacts because construction activities would occur within appropriately zoned industrial and commercial areas and impacts would be temporary and limited to construction activities, and construction noise/vibration impacts to sensitive receptors would not be expected. However, implementation of the 2016 AQMP control measures ~~associated with construction of overhead catenary lines~~ could result in significant noise and vibration impacts due to the geographic proximity of sensitive receptors.

According to the 2016 RTP/SCS Program EIR, grading and construction activities associated with the proposed transportation projects, as well as anticipated development, would intermittently and temporarily generate noise and vibration levels above ambient background levels in such a way that would not have occurred without the project. Noise and vibration levels in the immediate vicinity of the construction sites would increase substantially at times for an extended duration, resulting in temporary noise increases at nearby sensitive receptors, creating significant adverse noise impacts.

Operational Impacts: Implementation of the 2016 AQMP control measures is not expected to result in significant adverse operational noise impacts because the 2016 AQMP control measures affect existing commercial or industrial facilities typically located in appropriately zoned industrial or commercial areas. It is not expected that modifications to install air pollution control equipment would substantially increase ambient noise levels in the area, either permanently or intermittently, or expose people to excessive noise levels that would be noticeable above and beyond existing ambient levels. Although overhead catenary lines could be installed to comply with certain control measures, these lines would be installed along existing roadways and transportation corridors and as such would not result in the construction of new roadways or corridors.

Control measures are not expected to require street sweeping in areas where there is no current street sweeping. Rather it may increase the number of times that roads in certain areas are swept. The roads that are most likely to require additional sweeping are those in industrial and commercial areas where sensitive receptors are not located. Therefore, because additional street sweeping is not expected to be required in residential or other noise-sensitive areas, additional street sweeping activities that may be required are not expected to result in significant noise impacts.

According to the 2016 RTP/SCS Program EIR, noise sensitive land uses could be exposed to operational noise in excess of normally acceptable noise levels. These areas could experience substantial increases in noise as a result of the following: operation of expanded or new transportation facilities (i.e., increased traffic resulting from new or expanded highways, the use of new transit corridors or increased use of existing corridors, and a capacity increase in freight and passenger rail), and increased vehicle activity (autos, trucks, buses, trains etc.) associated with development and resulting in increased ambient noise next to transportation facilities.

The 2016 AQMP control measures would result in significant adverse noise impacts and when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to noise identified in the 2016 RTP/SCS, therefore resulting in a significant cumulative impact.

5.13.2 MITIGATION MEASURES

No additional mitigation measures to reduce the significant cumulative impacts to noise have been identified.

5.13.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative impacts to noise from implementation of the 2016 AQMP would remain significant and unavoidable.

5.14 POPULATION AND HOUSING

5.14.1 CUMULATIVE IMPACTS

Impacts to population and housing were considered and fully evaluated in the NOP/IS prepared for the 2016 AQMP. As concluded in the NOP/IS, implementation of the 2016 AQMP is not expected to result in significant adverse impacts to population and housing. The 2016 AQMP would affect existing commercial or industrial facilities located in predominantly industrial or commercial urbanized areas throughout the SCAQMD and, as such, is not anticipated to generate any significant effects, either directly or indirectly, on the SCAQMD's population or population distribution. Consistent with past experience, it is expected that the existing labor pool within the southern California area would accommodate the labor requirements for any modifications requiring construction at affected facilities. Furthermore, the 2016 AQMP contains no provisions that would cause displacement of substantial numbers of people or housing necessitating construction of replacement housing elsewhere. Therefore, implementing the 2016 AQMP control measures is not expected to result in changes in population densities or induce significant growth in population.

Implementation of the 2016 RTP/SCS would have a potential to influence the distribution of population, households, and employment. It is anticipated that significant impacts would include substantial induced population growth within urban areas that are adjacent to transit and new ROW acquisitions that could result in the displacement of a substantial number of existing businesses and homes, separation of residences from community facilities and services. While the 2016 RTP/SCS encourage growth in existing urbanized area, the proposed land use strategies would not accommodate all of the growth anticipated in the region. Some development would still be expected to occur in areas that would have the potential to convert open and natural land areas near the edge of existing urbanized areas to urban development.

Short-term construction-related impacts and long-term or permanent displacement, as well as off-site impacts from new facilities, would occur as a result of implementation of the 2016 RTP/SCS. Indirect impacts from the changes in population distribution expected to occur due to the 2016 RTP/SCS's transportation investments and land use policies are also expected.

For the 2016 AQMP, impacts to population and housing were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse population and housing impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulatively considerable impacts to population and housing identified in the 2016 RTP/SCS because there are no potential population and housing impacts that could be generated by the 2016 AQMP.

5.14.2 MITIGATION MEASURES

Since the 2016 AQMP would not result in cumulatively significant impacts to population and housing, no further mitigation is necessary.

5.14.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative population and housing impacts from implementation of the 2016 AQMP would remain less than significant.

5.15 PUBLIC SERVICES

5.15.1 CUMULATIVE IMPACTS

Impacts to public services were considered and fully evaluated in the NOP/IS prepared for the 2016 AQMP. As concluded in the NOP/IS, implementation of the 2016 AQMP is not expected to result in significant adverse impacts to public services. Although implementing 2016 AQMP control measures may increase the use of alternative clean fuels, for example, there would be a commensurate reduction in currently used petroleum fuels. As first responders to emergency situations, police and fire departments may assist local hazmat teams with containing hazardous materials, putting out fires, and crowd control to reduce public exposures to hazardous materials releases. In many situations, implementing AQMP control measures may reduce hazardous materials use, e.g., formulating coatings with less hazardous formulations. Most industrial facilities have on-site security that control public access to facilities and therefore, an increase in the need for police services is not expected. Furthermore, most industrial facilities have on-site fire protection personnel and/or have agreements for fire protection services with local fire departments. For these reasons, implementing the 2016 AQMP is not expected to require additional fire or police protection services. In addition, implementation of the 2016 AQMP is not expected to induce population growth and as such would not increase or otherwise alter the demand for schools and parks in the SCAQMD. Therefore, no significant adverse impacts to schools or parks are foreseen as a result of adopting the proposed 2016 AQMP.

According to the 2016 RTP/SCS Program EIR, implementing the 2016 RTP/SCS would adversely affect public services and utilities. The 2016 RTP/SCS also includes land use strategies that might influence development patterns in the region for the next 25 years. The Plan's land use strategies focus new growth in HQTAs, existing suburban town centers and walkable, mixed-use communities. According to the Plan, focusing new growth in HQTAs is an important aspect of the proposed land use strategies. The region is expected to add approximately 3.8 million new people, approximately 1.5 million new households, and approximately 2.4 million new jobs during the next 25 years. Moreover, the transportation projects included in the RTP/SCS that involve transit, passenger rail, and active transportation are concentrated in urban and suburban areas, including Palm Springs, Riverside, San Bernardino, Anaheim, Irvine, the Los Angeles Basin, the San Gabriel Valley, the San Fernando Valley, Santa Clarita, Palmdale, and Lancaster. As these urban and suburban areas experience a potentially higher density in terms of a higher housing/job ratio and more densified, mixed-use development, additional fire protection and emergency response services would be required to meet emergency response standards. Such increased density in these areas would have the potential to exceed the capacity of existing public services. Expected significant impacts would include demand for more police, fire, and emergency personnel and facilities, demand for more school facilities and teachers. The 2016 RTP/SCS concluded that impacts to fire services would contribute to regionally cumulatively considerable impacts to staffing levels and response times of police, fire and emergency services.

For the 2016 AQMP, impacts to public services were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse public service impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulatively considerable impacts to public services identified in the 2016 RTP/SCS because potential public service impacts identified in the 2016 RTP/SCS Program EIR are different than the potential public service impacts that could be generated by the 2016 AQMP and, geographically, there is no overlap between the 2016 AQMP projects that may affect public services impacted by the 2016 RTP/SCS.

5.15.2 MITIGATION MEASURES

Since the 2016 AQMP would not result in cumulatively significant impacts to public services, no further mitigation is necessary.

5.15.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative public services impacts from implementation of the 2016 AQMP would remain less than significant.

5.16 RECREATION

5.16.1 CUMULATIVE IMPACTS

Impacts to recreation were considered and fully evaluated in the NOP/IS prepared for the 2016 AQMP. As concluded in the NOP/IS, implementation of the 2016 AQMP is not expected to result in significant adverse impacts to recreation. The proposed 2016 AQMP contains no provisions that would affect land use plans, policies, ordinances, regulations, or population growth. Land use and other planning considerations are determined by local governments. No land use or planning requirements, including those related to recreational facilities, will be altered by the 2016 AQMP. The 2016 AQMP does not have the potential to directly or indirectly induce population growth or redistribution that could adversely affect recreational resources. As a result, the control measures would not increase the use of, or demand for, existing neighborhood and/or regional parks or other recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment. Therefore, no significant adverse impacts to recreation are foreseen as a result of adopting the proposed 2016 AQMP.

Implementation of the transportation projects and land use patterns anticipated by the strategies in the 2016 RTP/SCS would have the potential to increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated, constituting a potentially significant impact. The 2016 RTP/SCS provides transportation improvements to accommodate the anticipated population increase of approximately 3.8 million new people from 2014 to 2040, over the 25-year planning horizon. The 2016 RTP/SCS would encourage new growth in urbanized areas such as HQTAs and other livable corridors and neighborhood mobility areas sometimes within the HQTAs above their existing planned density levels; therefore, it would be expected to result in increased use of existing neighborhood parks and other recreational facilities such that substantial physical deterioration facilities may be anticipated. The 2016 RTP/SCS Program EIR concluded that implementation of 2016 RTP/SCS projects would result in significant impacts prior to mitigation.

Impacts to recreation were determined to be below the level of significance in the NOP/IS and the 2016 AQMP would not in itself generate significant adverse recreation impacts. Further, the 2016 AQMP, when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would not contribute to cumulative considerable impacts to recreation identified in the 2016 RTP/SCS because no potential recreation impacts could be generated by the 2016 AQMP, and, geographically, there is no overlap between the 2016 AQMP projects that may affect recreation impacted by the 2016 RTP/SCS.

5.16.2 MITIGATION MEASURES

Since the 2016 AQMP would not result in cumulatively significant impacts to recreation, no further mitigation is necessary.

5.16.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative recreation impacts from implementation of the 2016 AQMP would remain less than significant.

5.17 SOLID AND HAZARDOUS WASTE

5.17.1 CUMULATIVE IMPACTS

Implementation 2016 AQMP control measures would not significantly increase disposal of spent batteries, activated carbon, filters, and catalysts, and the early retirement of older equipment/vehicles and replacement with newer and lower emission technology equipment, would not generate significant additional waste. Since spent batteries are required to be and are largely recycled, the increased use of EVs and hybrid vehicles would not result in a significant increase in the illegal disposal of batteries. In addition, solid waste impacts due to 2016 AQMP air pollution control technologies would not be significant because spent carbon and catalysts are usually recycled and reused rather than disposed in landfills and filter waste would be small because the amount of material collected is small. Control measures that would require new equipment can require that retirement occurs as the life of the old equipment is exhausted and new equipment is put into service. For equipment that may be retired before the end of its useful life, that equipment may be reused in areas outside the Basin (with the exception of vehicles). Equipment with no remaining useful life is expected to be recycled for metal content. However, the impacts from waste generated from construction of 2016 AQMP control measures and from vehicle scrapping programs could result in significant impacts.

Impacts from solid waste were discussed under the combined category of Utilities and Service Systems in the 2016 RTP/SCS Program EIR, whereas impacts from hazardous waste were considered under the Hazardous Materials Section of the 2016 RTP/SCS Program EIR. Implementing the 2016 RTP/SCS would result in significant amounts of solid waste associated with construction activities of transportation projects and urban development. Construction debris would be used as fill, recycled or transported to the nearest landfill and disposed of appropriately. The 2016 RTP/SCS also has the potential to result in significant impacts when the landfill designated for the project area is insufficient in capacity to accommodate solid waste disposal needs. All projects in 2016 RTP/SCS must comply with federal, state, and local statutes and regulations related to solid waste.

The 2016 AQMP control measures would result in significant adverse solid and hazardous waste impacts and when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to solid and hazardous waste identified in the 2016 RTP/SCS, therefore resulting in a significant cumulative impact.

5.17.2 MITIGATION MEASURES

No additional mitigation measures to reduce the significant cumulative impacts to solid and hazardous waste have been identified.

5.17.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative impacts to solid and hazardous waste from implementation of the 2016 AQMP would remain significant and unavoidable.

5.18 TRANSPORTATION AND TRAFFIC

5.18.1 CUMULATIVE IMPACTS

Some 2016 AQMP control measures could necessitate the construction of overhead catenary lines, within or adjacent to existing roadways, streets, freeways, and/or transportation corridors. Such construction activities would generate traffic associated with construction worker vehicles and trucks delivering equipment, materials and supplies to the project site during the duration of the construction activities. Construction activities, including potential lane closures, were considered to be significant.

Similarly, transportation infrastructure improvements pertaining to overhead catenary electrical lines could require the dedication of an existing lane exclusive to vehicles using the overhead catenary electrical lines or fixed guideway systems. The dedication of an existing lane would mean that other vehicles would have reduced access to available driving lanes. Thus, a reduction in the number of available lanes on a roadway to accommodate vehicles using the overhead catenary electrical lines could adversely affect traffic and congestion for all other vehicles on the road. Furthermore, if the barge-based bonnet technology is used to reduce emissions from ocean going vessels, the increase in barges at the harbors could create a significant congestion and traffic hazard impact. Significant adverse operational traffic impacts are, therefore, anticipated to be generated by the 2016 AQMP. Other than this impact, no new streets, roads, freeways, or rail lines would be required and the 2016 AQMP control measures would apply to existing transportation corridors, so no additional significant traffic impacts are expected.

The 2016 AQMP relies on transportation and related control measures developed by SCAG in the 2016 RTP/SCS. According to the Transportation, Traffic, and Safety section of the 2016 RTP/SCS Program EIR, implementation of the proposed plan has the potential to result in several significant and less than significant traffic and transportation impacts. The impacts from the 2016 RTP/SCS considered to be significant are as follows:

- Vehicle Miles Traveled (VMT): Substantial growth and development is expected to occur within the region. Based on SCAG's modeling results, average daily VMT are expected to grow from 448 million miles to 504 million miles per day in 2040 which constitutes a 13.3 percent increase over the period and includes light, medium, and heavy-duty VMT in all six counties. Even though the 2016 RTP/SCS aims to reduce per capita VMT, total demand to move people and goods would continue to grow due to the region's population increase. The 2016 RTP/SCS, therefore, targets transportation systems that have room to grow including transit, rail sections, and express lanes. Although per capita VMT would decrease, the environment would experience an overall increase in VMT which would be significant.

- Vehicle Hours of Delay for Heavy-Duty Trucks: The transportation system is heavily influenced by goods movement, particularly by heavy duty trucks. Despite efforts to improve the efficiency of goods movement, increased demand for goods would lead to an increase from 118,000 to 184,000 average daily heavy-duty truck vehicle hours of delay by 2040, a 36 percent increase and thus, a significant impact.

- Emergency Access: Implementing the 2016 RTP/SCS has the potential to conflict with emergency access criteria. The timing, location, and duration of construction activities for the proposed transportation projects could result in delayed emergency vehicle response times or otherwise disrupt delivery of emergency response services and could result in significant impacts.

The impacts from the 2016 RTP/SCS considered less-than significant are as follows:

- Vehicle Hours of Delay: Average vehicle hours of delay would be reduced from 2,500,000 vehicle hours in 2012 to 2,118,000 vehicle hours in 2040, and as such would constitute a less than significant impact.

- System-Wide Fatality and Injury- Implementation of the 2016 RTP/SCS would contribute to a lower system-wide fatality accident rate and injury rate for all travel modes in 2040 compared to the existing conditions. The system-wide daily fatality rate would be 0.17 fatalities per million persons for all travel modes when compared to existing rate of 0.20. The system wide daily injury rate would be 12.93 injuries per million persons for all travel modes, a decrease of 5.34 daily injuries per million persons when compared to the existing rate of 18.27. The reductions in fatality and injury rates would be beneficial and would constitute less than significant impacts.

- Air Traffic Patterns- Population growth that is expected to occur by 2040 would likely result in increased air traffic in all nine major commercial airports in Southern California. Based on the statistics in SCAG's aviation forecast, there is adequate capacity in provisioning for goods and passenger services that the 2016 RTP/SCS is expected to have a less than significant impact on air traffic patterns.

The 2016 AQMP control measures would result in significant adverse transportation and traffic impacts and when combined with past, present, and reasonably foreseeable activities, and in particular with transportation projects projected in the 2016 RTP/SCS, would contribute to cumulatively considerable impacts to transportation and traffic identified in the 2016 RTP/SCS. Therefore, resulting in a significant cumulative impact.

5.18.2 MITIGATION MEASURES

No additional mitigation measures to reduce the significant cumulative impacts to transportation and traffic have been identified.

5.18.3 CUMULATIVE IMPACTS AFTER MITIGATION

Cumulative impacts to transportation and traffic from implementation of the 2016 AQMP would remain significant and unavoidable.

CHAPTER 6

ALTERNATIVES

6.0 Introduction
6.1 Methodology for Developing Project Alternatives
6.2 Alternatives Rejected as Infeasible
6.3 Alternatives to the 2016 AQMP
6.4 Alternatives Analysis
6.5 Comparison of Project Alternatives to the 2016 AQMP
6.6 Environmentally Superior and Lowest Toxic Alternative
6.7 Conclusion

6.0 INTRODUCTION

This Program EIR provides a discussion of alternatives to the proposed project as required by CEQA. Pursuant to the CEQA guidelines, alternatives should include realistic measures to attain the basic objectives of the proposed project but would avoid or substantially lessen any of the significant effects of the project, and provide means for evaluating the comparative merits of each alternative (CEQA, Guidelines, §15126.6(a)). In addition, though the range of alternatives must be sufficient to permit a reasoned choice, they need not include every conceivable project alternative (CEQA Guidelines §15126.6(a)). The key issue is whether the selection and discussion of alternatives fosters informed decision making and public participation. An EIR need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative (CEQA Guidelines, §15126.6(f)(3).

6.1 METHODOLOGY FOR DEVELOPING PROJECT ALTERNATIVES

The alternatives typically included in CEQA documents for proposed SCAQMD rules, regulations, or plans are developed by breaking down the project into distinct components (e.g., emission limits, compliance dates, applicability, exemptions, pollutant control strategies, etc.) and varying the specifics of one or more of the components. Different compliance approaches that generally achieve the objectives of the project may also be considered as project alternatives.

The 2016 AQMP identifies control measures and strategies to demonstrate that the region will: (1) attain the revoked 1997 8-hour ozone standard (80 ppb) by 2023; (2) attain the 2008 8-hour ozone standard (75 ppb) by 2032; (3) attain the 2012 annual PM2.5 standard (12 ug/m3) by 2025; (4) attain the 2006 24-hour PM2.5 standard (35 ug/m3) by 2019; and (5) attain the revoked 1979 1-hour ozone standard (120 ppb) by 2022. The 2016 AQMP also discusses the recently adopted new federal 8-hour ozone standard (70 ppb), as well as incorporates toxics, climate change, energy, transportation, goods movement, infrastructure and other planning efforts that affect future air quality.

The proposed attainment strategy focuses on reduction of ozone precursors (NOx and VOC), direct PM2.5, and PM2.5 precursors (NOx). NOx emissions lead to the formation of both ozone and PM2.5. Therefore, the most significant air quality challenge faced by the SCAQMD is to reduce NOx emissions sufficiently to meet the upcoming ozone and PM2.5 federal standard deadlines. The 2016 AQMP analyses indicate that an additional 43 percent NOx emission reduction is needed by 2023 and 55 percent is needed by 2031 to attain the 8-hour ozone standard. The majority of NOx emission reductions are expected to come from mobile sources.

The possible alternatives to the proposed 2016 AQMP are limited by the nature of the project. For example, the SCAQMD is required to prepare a PM2.5 and ozone AQMP that demonstrates attainment of the federal ambient air quality standards by applicable dates. The magnitude of emission reductions needed for the attainment of these NAAQS requires an aggressive mobile source control strategy supplemented with focused, strategic stationary source control measures and close collaboration with federal, state, and regional governments, local agencies, businesses, and the public.

Further, 2016 AQMP control measures are developed to achieve the maximum emission reduction potential that is technically feasible and cost-effective. Because, the 2016 AQMP includes all feasible control measures identified as part of the AQMP development process and control measures reflect the maximum emission reduction potential, it is difficult to develop alternatives that would still achieve the project objectives, including attaining the federal ozone and PM2.5 standard, but are substantially different than the 2016 AQMP.

In spite of the limitations identified above with regard to developing project alternatives, similar to previous AQMP Program EIRs, alternatives to the 2016 AQMP focus on emphasizing different pollutant control strategies. For example, alternatives could rely more only on regulation only versus greater reliance on incentive funding and mobile source control measures. Ultimately, all project alternatives must demonstrate attainment of the federal ozone and PM2.5 standards.

Development of the ozone and PM2.5 attainment control strategy relies on baseline emissions specified by the emissions inventory of all emissions sources in the Basin. The federal CAA §172(c)(3) requires all plan [AQMP] submittals to include a comprehensive, accurate, and current inventory of actual emissions from all sources of the relevant pollutant(s). To fulfill the intent of this requirement, the year 2012 was selected as the baseline year for analyzing the effectiveness of 2016 AQMP control measures in attaining the ozone and PM2.5 standard. Typically, the existing setting is established at the time the NOP/IS is circulated for public review, which was July 2016. This baseline is used for all environmental topics analyzed in this Program EIR.

6.2 ALTERNATIVES REJECTED AS INFEASIBLE

In accordance with CEQA Guidelines §15126.6(c), a CEQA document should identify any alternatives that were considered by the lead agency, but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination. Section 15126.6(c) also states that among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are: (1) failure to meet most of the basic project objectives; (2) infeasibility; or (3) inability to avoid significant environmental impacts.

As noted in Section 6.2, the range of feasible alternatives to the 2016 AQMP is limited by the nature of the proposed project and associated legal requirements. Similarly, the range of alternatives considered, but rejected as infeasible is also relatively limited. The following subchapters identify six potential alternatives to the 2016 AQMP that were rejected for the reasons explained in each subchapter.

6.2.1 NO PROJECT ALTERNATIVE – NO FURTHER ACTION

CEQA documents typically assume that the adoption of a no project alternative would result in no further action on the part of the project proponent or Lead Agency. For example, in the case of a proposed land use project such as a housing development, adopting the No Project Alternative terminates further consideration of that housing development or any housing development alternative identified in the associated CEQA document. In that case, the existing setting would typically remain unchanged.

The concept of taking no further action (and thereby leaving the existing setting intact) by adopting a No Project Alternative does not readily apply to an update of an already adopted and legally mandated plan such as the AQMP. Adopting a no project alternative for an update to the AQMP does not imply that no further action will be taken (i.e., halting implementation of the existing AQMP). The federal and state Clean Air Acts require the SCAQMD to revise and implement the AQMP in order to attain all applicable ozone and PM2.5 state and national ambient air quality standards. A no further action No Project Alternative in the case of the AQMP is not a legally viable alternative. Consequently, the No Project Alternative presented in this Program EIR is the continued implementation of the 2012 AQMP. Continued implementation of the 2012 AQMP without additional reduction measures would not be a feasible alternative because the SCAQMD is required to submit to U.S. EPA an ozone and PM2.5 AQMP that demonstrates attainment of the applicable ozone and PM2.5 NAAQS by the applicable dates, as explained above. However, continued implementation of the 2012 AQMP as the No Project Alternative (see Section 6.3.1 below) is consistent with CEQA guidelines §15126.6(e)(2) (italics added):

"The 'no project' analysis shall discuss the existing conditions at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced, *as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services…*"

It should be noted that, except for air quality, there would be no further incremental impacts on the existing environment if no further action is taken. Although there are existing rules that may have future compliance dates, potential adverse impacts from these rules have already been evaluated in the Final Program EIR for the 2012 AQMP and subsequent rule-specific CEQA documents. Air quality would continue to improve to a certain extent, but it is unlikely that all state or federal ozone standards would be achieved as required by the federal and California CAAs.

6.2.2 FULL SOLAR CONVERSION ONLY

Under this alternative, all electricity would be generated by solar power. Public comments provided on the 2016 AQMP and NOP/IS (Appendix B) have requested that the alternative of complete solar power be evaluated.

Under this alternative, electricity would be generated by the construction and operation of additional solar generating systems. Some of these would be expected to be on existing housing, structures, and buildings. However, the amount of electricity that would need to be generated would require new large solar installations, which have generally been placed in the desert areas of California (CEC, 2016g), due to the large demand for land that is required. In 2015, solar thermal facilities generated a total of 14,953 gigawatt-hours or about 7.64 percent of the state's total electricity production (CEC, 2016g). Therefore, the state would need a significant increase in the construction and operation of additional solar generating systems.

While the solar technology has made great advances in recent years, there are still a number of existing concerns regarding the reliability and transmission of solar power. Large solar installations have been located in the desert portions of the state. As such, transmission lines that connect solar installations to the more populated portions of the state are not currently available.

Further, electricity would only be generated when the sun was out. While this is common in California, there are times when it is cloudy, rainy or night time when electricity would not be produced. So some type of electricity storage system may be required. The technology for large battery backup systems has not yet been developed which would mean that there would still be a requirement for natural gas-generated electricity. Therefore, full solar conversion is not feasible at this time.

A full solar alternative would result in a number of additional potentially significant environmental impacts than the current proposed AQMP strategy. This alternative would require the conversion of large portion of presumably desert habitat to industrial facilities, resulting in potentially significant impacts to aesthetics (impacts to visual character and glare), biological impacts (destruction of native habitats for rare and endangered species such as the desert tortoise), cultural impacts, land use impacts (conversion of native habitat to industrial land uses), additional air, noise, and traffic impacts associated with construction activities, and other similar impacts.

Finally, converting to full solar is an ambitious goal that has future possibilities. A full solar alternative to the 2016 AQMP would not result in sufficient emission reductions to assure attainment of the federal or state ozone standards. As discussed in Chapter 4.1.5, the carrying capacities (the maximum allowable NOx emissions to meet ozone standards) are estimated to be 150 tons/day NOx in 2023, and 100 tons/day NOx in 2031. NOx reductions of approximately 43 percent and 55 percent from the baseline levels are needed in 2023 and 2031, respectively. Elimination of natural gas-fired electricity power plants would not result in sufficient emission reductions to comply with ozone standards. Therefore, a full solar alternative would not achieve the primary objective of the proposed project to demonstrate attainment of the federal or state standards for ozone. For this reason, the alternative is considered to be infeasible at this time.

6.2.3 HEAVY VOC REDUCTION STRATEGY

The Heavy VOC Reductions Alternative scenario would aim to implement more VOC emission reductions to achieve ozone attainment, as opposed to the current 2016 AQMP strategy which focuses on NOx emission reductions. NOx levels would be held at or nearly constant and attainment would be dependent upon the reduction of VOC emissions, primarily in the areas of cleaner mobile sources, consumer products and lower VOC solvents. The VOC heavy approach is technically more uncertain, because it would require technology breakthrough in formulations of solvents or consumer products, which are not currently available. One result of the strategy may be the development of potentially new toxic formulations; however, replacement of solvents with low VOC formulations tends to be less toxic than conventional solvents.

Table 6.2-1 shows the limited feasible VOC control measures that have been identified as part of the 2016 AQMP. The VOC emission reductions currently total about 7-10 tons per day. Under this alternative, significant additional VOC emissions reductions would be required. Sufficient feasible VOC emission reductions are not available to demonstrate compliance with the ozone ambient air quality standards because there is a limited number of VOC sources and limited number of feasible VOC emission reductions. As a matter of fact, the ozone isopleths[1] for the two

[1] April 2016 AQMP Advisory Group Meeting #9 – http://www.aqmd.gov/docs/default-source/Agendas/aqmp/advisory9-item2.pdf (Slides 7-8)

highest ozone stations (Fontana and Redlands), show that even if all the VOC emissions were eliminated, the 75 ppb ozone standard would still not be met without NOx emission reductions (SCAQMD, 2016).

TABLE 6.2-1

2016 AQMP VOC Control Measures

Number	Title	Emission Reductions (tons/day) (2023/2031)
FUG-01	Improved Leak Detection and Repair [VOC]	2 / 2
CTS-01	Further Emission Reductions from Coatings, Solvents, Adhesives, and Sealants [VOC]	1 / 2
FLX-02	Stationary Source VOC Incentives [VOC]	TBD
ECC-02	Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures [NOx, VOC]	0.07 / 0.29
ECC-03	Additional Enhancements in Reducing Existing Residential Building Energy Use [NOx, VOC]	0.2 / 0.3
CMB-01	Transition to Zero and Near-Zero Emission Technologies for Stationary Sources [NOx, VOC]	0.9 / 1.8
CMB-03	Emission Reductions from Non-Refinery Flares [NOx, VOC]	1.7 / 1.8
BCM-10	Emission Reductions from Greenwaste Composting [VOC, NH3]	1.5 / 1.8

Finally, air quality modeling completed as part of the 2016 AQMP shows that NOx emission reductions are much more effective in demonstrating attainment than VOC emission reductions and that sufficient VOC emission reductions are not expected to be available to demonstrate compliance with the ambient air quality standards, so that this is not considered to be a feasible alternative.

6.2.4 SEASONAL CONTROL OF VOCS

VOC control measures in this alternative would allow affected facilities to shift emissions from the high ozone formation season (summer) to the low ozone formations season (winter) defined as November through April. The mechanism by which this alternative could occur would be through additional incentives to build and/or take public transit during the summer months. Sensitivity runs were performed as part of the evaluation of the SCAQMD intercredit trading program (Rule 2501) that showed there could be some air quality benefits from shifting VOC emissions to the winter. This alternative was rejected because the benefit would not be enough to attain and the need to fully implement all feasible control measures and all available control measures that are required to meet the applicable attainment demonstrations.

6.2.5 LOCALIZED PM2.5 EMISSION REDUCTIONS

Localized PM2.5 emission reductions have been evaluated in previous AQMP EIRs as a strategy for compliance with the PM2.5 ambient air quality standards. Under this alternative, sources near areas that violate PM2.5 ambient air quality standards would be targeted for additional control. Based on sensitivity modeling completed for the 2016 AQMP, localized PM2.5 emission reductions (as opposed to basin-wide reductions) would not help meet the annual federal annual PM2.5 standard. If feasible control measures become available in the future, this control strategy could help assist with the PM2.5 attainment. However, this alternative was rejected because feasible control measures to implement a localized PM2.5 emission reduction strategy are not currently available.

6.2.6 ALTERNATIVE LOCATION

CEQA requires consideration of an alternative location alternative if significant effects of the project would be avoided or substantially lessened by putting the project in another location. Pursuant to CEQA Guidelines §15126.6 (f)(2)(B), if the Lead Agency concludes that no feasible alternative locations exist, it must disclose the reasons for this conclusion, and should include the reasons in the EIR. For example, in some cases there may be no feasible alternative locations for a geothermal plant or mining project which must be in close proximity to natural resources at a given location. The 2016 AQMP applies to the entire area of the SCAQMD's jurisdiction. The SCAQMD has no authority to adopt and enforce 2016 AQMP control measures in areas outside its jurisdiction. CEQA does not grant an agency new powers independent of the powers granted to the agency by other laws (CEQA Guidelines §15040 (b)). Therefore, an alternative location is not considered to be a feasible alternative.

6.3 ALTERNATIVES TO THE 2016 AQMP

Because of the substantial emission reductions necessary to bring the region into attainment with the: (1) revoked 1997 8-hour ozone standard (80 ppb) by 2023; (2) the 2008 8-hour ozone standard (75 ppb) by 2032; (3) the 2012 annual PM2.5 standard (12 ug/m3) by 2025; (4) the 2006 24-hour PM2.5 standard (35 ug/m3) by 2019; and (5) the revoked 1979 1-hour ozone standard (120 ppb) by 2022, the SCAQMD is relatively limited with regard to the number of potential alternatives to the 2016 AQMP. As a result, with the exception of the No Project Alternative and the Regulation Only Alternative, all project alternatives include the same mobile source control measures because of the magnitude of the emissions generated by mobile sources and the substantial emission reductions required to attain the PM2.5 and ozone standards by the applicable dates. Alternatives being evaluated as part of the 2016 AQMP include a Mobile Source Reduction Only that would not result in additional control of stationary sources; a Regulation Only alternative that considers only those control measures where the SCAQMD or CARB have the authority to regulate; and an Expanded Incentive Funding alternative that would increase incentive funding. The following sections provide a brief description of the alternatives.

6.3.1 ALTERNATIVE 1: NO PROJECT ALTERNATIVE

CEQA requires the evaluation of the No Project Alternative, which consists of what would occur if the proposed project was not approved; in this case, not adopting the 2016 AQMP. The net effect of not adopting the 2016 AQMP would be a continuation of the 2012 AQMP and the 2007 AQMP. This approach is consistent with CEQA Guidelines §15126.6 (e)(3)(A), which states: "When the project is the revision of an existing land use or regulatory plan, policy or ongoing operation, the 'no project' alternative will be the continuation of the existing plan, policy, or operation into the future. Typically this is a situation where other projects initiated under the existing plan will continue while the new plan is developed. Thus, the projected impacts of the proposed plan or alternative plans would be compared to the impacts that would occur under the existing plan."

SCAQMD continues to implement the 2012 AQMP, which received a limited approval and limited disapproval by U.S. EPA on April 14, 2016. Table 2.2-1 of Section 2.2 summarizes the progress achieved toward fulfilling SCAQMD's emissions reductions commitments to attain the federal standards by the required dates. As shown in Table 2.2-1, for the control measures adopted by the SCAQMD over this period, 11.7 tons per day of PM2.5 reductions was achieved by 2014 and 2.4 tons per day of VOC reductions and 19.5 tons per day of NOx reductions will be achieved by 2023. Table 6.3-1 shows the control measures that have been implemented since 2012 and the ones for which further evaluation is underway. The No Project Alternative assumes that these control measures would still be implemented.

SCAQMD and CARB achieved their 2007 AQMP short-term emission reduction targets. Therefore, the 2007 AQMP does not contain any remaining short-term stationary source or mobile source control measures to be adopted. All remaining necessary emission reductions to demonstrate attainment from implementing the 2007 AQMP would be obtained through implementing CAA §182(e)(5) measures, which are also referred to as "black box" measures.

TABLE 6.3-1

2012 AQMP Emission Reductions (tons per day) by Measure/Adoption Date

Control Measure #	Control Measure Title	Adoption Date	Commitment		Achieved	
			2014	2023	2014	2023
PM2.5 EMISSIONS						
BCM-01	Further Reductions from Residential Wood Burning Devices (R445)	2013	7.1	--	7.1	--
BCM-02	Further Reductions from Open Burning (R444)	2013	4.6	--	4.6	--
BCM-03	Emission Reductions from Under-Fired Charbroilers	TBD	--	TBD	--	TBD
BCM-04	Further Ammonia Reductions from Livestock Waste	TBD	--	TBD	--	TBD
TOTAL PM2.5 REDUCTIONS			**11.7**	**--**	**11.7**	**--**
NO_x EMISSIONS						
OFFRD-01	Extension of the SOON Provision for Construction/Industrial Equipment	Ongoing	--	7.5	--	7.5
CMB-01	Further Reductions from RECLAIM [Regulation XX]	2015	2	3	0	12
CMB-02	NO_x Reduction from Biogas Flares	Rulemaking Underway	--	TBD	--	TBD
CMB-03	Reductions from Commercial Space Heating	2016	--	0.18	--	TBD
TOTAL NO_x EMISSIONS			**2**	**10.7**	**0**	**19.5**
VOC EMISSIONS						
CTS-01	Further VOC Reductions from Architectural Coatings [R1113]	2016	--	2	--	1
CTS-02	Further Emission Reductions from Miscellaneous Coatings, Adhesives, Solvents and Lubricants	Rulemaking Underway	--	1	--	--
CTS-03	Further VOC Reductions from Mold Release Products [R1161]	Rulemaking Underway	--	0.8	--	--
FUG-01	VOC Reductions from Vacuum Trucks [R1188]	Rulemaking Underway	--	TBD	--	--
FUG-02	Emission Reduction from LPG Transfer and Dispensing [R1177]	Rulemaking Underway	--	1	--	--
FUG-03	Emission Reduction from Fugitive VOC Emissions	2016	--	1	--	--
MCS-01	Application of All Feasible Measure Assessment [R1114]	Ongoing	TBD	TBD	0.4	1.4
TOTAL VOC EMISSIONS			**0**	**5.8**	**0.4**	**2.4**

TABLE 6.3-1 (concluded)

2012 AQMP Emission Reductions (tons per day) by Measure/Adoption Date

Control Measure #	Control Measure Title	Adoption Date	Commitment		Achieved	
			2014	2023	2014	2023
MULTI-POLLUTANT						
IND-01	Backstop Measure for Indirect Sources of Emissions from Ports and Port-Related Facilities [PR4001]	Rulemaking Underway	N/A[1]	N/A	N/A	N/A
MCS-02	Further Emission Reductions from Greenwaste Processing (Chipping and Grinding Operations not associated with composting)	Rulemaking Underway	--	TBD	--	TBD
MCS-03	Improved Start-Up, Shutdown, and Turnaround Procedures [R1123]	2014	--	TBD[2]	--	TBD
INC-01	Economic Incentive Programs to Adopt Zero and Near-Zero Technologies	Ongoing	--	--	--	--
INC-02	Expedited Permitting and CEQA Preparation Facilitating the Manufacturing of Zero and Near-Zero Technologies [All Pollutants]	Ongoing	--	--	--	--
EDU-01	Further Criteria Pollutant Reductions from Education, Outreach, and Incentives [All Pollutants]	Ongoing	--	--	--	--

1. Measure is designed to ensure reductions projected to occur are achieved
2. Reductions to be determined once the technical assessment is complete, and inventory and control approach are identified.

Table 6.3-2 shows the "black box" measure or long-term strategies from the 2007 AQMP. Because all control measures in Table 6.3-2 regulate mobile sources or the VOC content in consumer products, they are all considered to be ozone reduction control measures. The only exceptions to this assumption are the renewable energy and AB32 implementation control measures, which primarily address GHG emissions. Otherwise, there are no new control measures in Alternative 1 that specifically address reducing PM2.5 emissions.

The No Project Alternative would implement any remaining control measures in the 2012 AQMP and fulfill the "black box" measure commitment in the future pursuant to the 2007 AQMP to achieve the 1997 8-hour ozone standard (80 ppb) by 2023 but would not propose enough reductions to achieve the 2008 8-hour ozone standard (75ppb) by 2032 or the 2012 annual PM2.5 standard (12 $\mu g/m^3$) by 2025 as accomplished in the 2016 AQMP.

The No Project Alternative analyzed here will take into account the most current air quality setting (2016) and will include updated and refined control measures, but no new control measures.

TABLE 6.3-2

Long-Term (Black Box) Control Measures from the 2007 AQMP

SOURCE CATEGORY	METHOD OF EMISSIONS CONTROL	2012 AQMP CONTROL MEASURES AFFECTING SAME SOURCE
Light Duty Vehicles (SCLTM-01A)	Extensive retirement of high-emitting vehicles and accelerated penetration of ATPZEVs and ZEVs	ONRD-01 & ADV-01
On-Road Heavy Duty Vehicles (SCLTM-01B)	• Expanded modernization and retrofit of heavy-duty trucks and buses • Expanded inspection and maintenance program • Advanced near-zero and zero-emitting cargo transportation technologies	ONRD-03, ONRD-05 & ADV-06
Off-Road Vehicles (SCLTM-02)	Expanded modernization and retrofit of off-road equipment	OFFRD-01 & ADV-06
Consumer Products (SCLTM-03)	Ultra Low-VOC formulations; Reactivity-based controls	CTS-04
Fuels	More stringent gasoline and diesel specifications; Extensive use of diesel alternatives	No update [a]
Marine Vessels	More stringent emission standards and programs for new and existing ocean-going vessels and harbor craft	IND-01, OFFRD-05 & ADV-05
Locomotives	Advanced near-zero and zero emitting cargo transportation technologies	OFFRD-03 & ADV-02
Pleasure Craft	Accelerated replacement and retrofit of high-emitting engines	No update [a]
Aircraft	More stringent emission standards for jet aircraft (engine standards, clean fuels, retrofit controls); Airport bubble	ADV-07
Renewable Energy	Accelerated use of renewable energy and development of hydrogen technology and infrastructure	No update [a]
AB32 Implementation	Concurrent criteria pollutant reduction technologies	No update [a]

[a] No update means that the control measures continue to remain in effect as part of the Ozone SIP portion of the 2007 AQMP, but have not been updated as part of the 2016 AQMP.

6.3.2 ALTERNATIVE 2: MOBILE SOURCE REDUCTION ONLY

Under Alternative 2, no SCAQMD stationary source control measures would be implemented. Only CARB's mobile source and consumer product control measures and the SCAQMD's localized mobile source strategy would be implemented. In order to be a viable alternative to be considered, the shortfall of NOx emission reductions needed to demonstrate attainment the ozone standards would need to be classified as CAA §182(e)(5) measures. Attainment of the 2012 annual PM2.5 standards, similar to the conclusions in the 2016 AQMP, would be achieved with implementation of the ozone strategy. Table 6.3-3 summarizes the proposed mobile source control measures under this alternative.

TABLE 6.3-3

Proposed Control Measures Under Alternative 2

Number	Title	Implementing Agency	Emission Reductions (tons/day) (2023/2031)
EGM-01	Emission Reductions from New Development and Redevelopment Projects [All Pollutants]	SCAQMD	TBD
MOB-01	Emission Reductions at Commercial Marine Ports [NOx, SOx, CO]	SCAQMD	TBD
MOB-02	Emission Reductions at Rail Yards and Intermodal Facilities [NOx, PM]	SCAQMD	TBD
MOB-03	Emission Reductions at Warehouse Distribution Centers [All Pollutants]	SCAQMD	TBD
MOB-04	Emission Reductions at Commercial Airports [All Pollutants]	SCAQMD	TBD
MOB-05	Accelerated Penetration of Partial Zero-Emission and Zero-Emission Vehicles [VOC, NOx, CO]	CARB, SCAQMD	TBD
MOB-06	Accelerated Retirement of Older Light-Duty and Medium-Duty Vehicles [VOC, NOx, CO]	CARB, Bureau of Automotive Repair, SCAQMD	TBD
MOB-07	Accelerated Penetration of Partial Zero-Emission and Zero-Emission Light-Heavy- and Medium-Heavy-Duty Vehicles [NOx, PM]	CARB, SCAQMD	TBD
MOB-08	Accelerated Retirement of Older On-Road Heavy-Duty Vehicles [NOx, PM]	CARB, SCAQMD	TBD
MOB-09	On-Road Mobile Source Emission Reduction Credit Generation Program [NOx, PM]	CARB, SCAQMD	TBD
MOB-10	Extension of the SOON Provision for Construction/Industrial Equipment [NOx]	SCAQMD	2.0 / 2.0
MOB-11	Extended Exchange Program [VOC, NOx, CO]	SCAQMD	2.9 / 1.0 [NOx]
MOB-12	Further Emission Reductions from Passenger Locomotives [NOx, PM]	SoCal Regional Rail Authority	TBD

TABLE 6.3-3 (cont.)

Proposed Control Measures Under Alternative 2

Number	Title	Implementing Agency	Emission Reductions (tons/day) (2023/2031)
MOB-13	Off-Road Mobile Source Emission Reduction Credit Generation Program [NOx, SOx, PM]	SCAQMD	TBD
MOB-14	Emission Reductions from Incentive Programs [NOx, PM]	SCAQMD	11 / 7.8 [NOx]
ORLD-01	Advanced Clean Cars 2	CARB	NQ/0.6 (NOx) NQ/0.3 (ROG)
ORLD-02	Lower In-Use Emission Performance Assessment	CARB	NYQ
ORLD-03	Further Deployment of Cleaner Technology: On-Road Light-Duty Vehicles	CARB	7/5~~5~~ (NOx) 16/16 (ROG)
ORHD-01	Lower In-Use Emission Performance Level for Heavy-Duty Vehicles	CARB	NYQ
ORHD-02	Low-NOx Engine Standard	CARB	5 (NOx – CA action), 7 (NOx – Federal action)
ORHD-03	Medium and Heavy-Duty GHG Phase 2	CARB	NYQ
ORHD-04	Advanced Clean Transit	CARB	<0.1/0.1 (NOx) <0.1/<0.1 (ROG)
ORHD-05	Last Mile Delivery	CARB	<0.1/0.4 (NOx) <0.1/<0.1 (ROG)
ORHD-06	Innovative Technology Certification Flexibility	CARB	NYQ
ORHD-07	Zero Emission Airport Shuttle Buses	CARB	NYQ
ORHD-08	Incentive Funding to Achieve Further Emission Reductions from On-Road Heavy-Duty Vehicles	CARB	3/3 (NOx) 0.4/0.4 (ROG)
ORHD-09	Further Deployment of Cleaner Technology: On-Road Heavy Duty Vehicles	CARB	34/11 (NOx) 4/1 (ROG)
ORFIS-01	More Stringent National Locomotive Emission Standards	EPA	0.7/8 (NOx) <0.1/0.3 ROG
ORFIS-02	Tier 4 Vessel Standards	EPA	4 (NOx)
ORFIS-03	Incentivize Low Emission Efficient Ship Visits	CARB	NYQ
ORFIS-04	At-Berth Regulation Amendments	CARB	0.3/1 (NOx) <0.1/<0.1 (ROG)
ORFIS-05	Further Deployment of Cleaner Technology: Off-Road Federal and International Sources	CARB	13/10 (NOx) nyq (ROG)
OFFS-01	Zero Emission Off-Road Forklift Regulation Phase 1	CARB	1 (NOx) 0.1 (ROG)

TABLE 6.3-3 (concluded)

Proposed Control Measures Under Alternative 2

Number	Title	Implementing Agency	Emission Reductions (tons/day) (2023/2031)
OFFS-02	Zero Emission Off-Road Emission Reduction Assessment	CARB	NYQ
OFFS-03	Zero Emission Off-Road Worksite Emission Reduction Assessment	CARB	NYQ
OFFS-04	Zero Emission Airport Ground Support Equipment	CARB	<0.1/<0.1 (NOx) <0.1/<0.1 (ROG)
OFFS-05	Small Off-Road Engines	CARB	0.7/2 (NOx) 7/16 (ROG)
OFFS-06	Transport Refrigeration Units Used for Cold Storage	CARB	NYQ
OFFS-07	Low-Emission Diesel Requirement	CARB	0.6/2 (NOx)
OFFS-08	Further Deployment of Cleaner Technologies: Off-Road Equipment	CARB	21/17 (NOx) 21/20 (ROG)
CPP-01	Consumer Products Program	CARB	5 (ROG)

TBD means to be determined; NYQ means not yet quantified.

6.3.3 ALTERNATIVE 3: CARB OR SCAQMD REGULATION ONLY

The 2016 AQMP includes a control strategy constructed from traditional regulatory control measures, co-benefit measures and incentive-based measures that will require adopted guidelines and secured funding, along with federal enforceable commitments pursuant to U.S. EPA. Alternative 3 is designed to implement only traditional regulatory control measures and co-benefit measures. These measures are being proposed by both SCAQMD and CARB for stationary, area and mobile sources, and includes some measures regulating federal sources. By removing the emission reductions from the incentive-based measures, attainment of the standards is at risk. Therefore, by way of public comment suggestion, Alternative 3 would propose the following additional control measures to assist in making up the remaining emission reductions necessary to demonstration attainment of the ozone standards.

- Zero or near-zero emitting space heating technologies in new construction, home additions, and multi-family housing
- Establish a Port backstop rule with commitments to meet certain air pollution reduction milestones
- Adopt new and update existing fleet rules from light duty vehicles to heavy-duty equipment requiring zero emission vehicles or technologies
- Ensure zero emission lawn and garden equipment at new developments
- Develop indirect source rule to control pollution from warehouse operations
- Require solar energy technology in new construction and major remodels

If the emission reductions from the additional proposed control strategies are determined to not be enough to demonstrate attainment the ozone standards, the remaining NOx emission reductions would be classified as CAA §182(e)(5) measures.

Table 6.3-4 summarizes the proposed control measures under Alternative 3 that would be implemented through regulation by the SCAQMD. Table 6.3-5 summarizes the proposed control measures under Alternative 3 that would be implemented through regulation by CARB.

TABLE 6.3-4

SCAQMD Proposed Control Measure under Alternative 3

Number	Title	Emission Reductions (tons/day) (2023/2031)
SCAQMD Stationary Source NOx Measures		
CMB-03	Emission Reductions from Non-Refinery Flares [NOx, VOC]	1.4 / 1.5
CMB-04	Emission Reductions from Restaurant Burners and Residential Cooking [NOx]	0.8 / 1.6
CMB-05	Further NOx Reductions from RECLAIM Assessment [NOx]	0 / 5
ECC-01	Co-Benefit Emission Reductions from GHG Programs, Policies, and Incentives [All Pollutants]	TBD [a]
ECC-02	Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures [NOx, VOC]	0.3 / 1.1
ECC-04	Reduced Ozone Formation and Emission Reductions from Cool Roof Technology [All Pollutants]	TBD [a]
FLX-01	Improved Education and Public Outreach [All Pollutants]	N/A [b]
MCS-01	Improved Breakdown Procedures and Process Re-Design [All Pollutants]	N/A [b]
MCS-02	Application of All Feasible Measures [All Pollutants]	TBD [a]
SCAQMD Stationary Source VOC Measures		
FUG-01	Improved Leak Detection and Repair [VOC]	2 / 2
CTS-01	Further Emission Reductions from Coatings, Solvents, Adhesives, and Sealants [VOC]	1 / 2
ECC-02	Co-Benefits from Existing Residential and Commercial Building Energy Efficiency Measures [NOx, VOC]	0.07 / 0.29 [c]
CMB-03	Emission Reductions from Non-Refinery Flares [NOx, VOC]	1.7 / 1.8 [c]
BCM-10	Emission Reductions from Greenwaste Composting [VOC, NH3]	1.5 / 1.8 [c]
SCAQMD Stationary Source PM2.5 Measures		
BCM-01	Further Emission Reductions from Commercial Cooking [PM]	3.3/3.3
BCM-02	Emission Reductions from Cooling Towers [PM]	TBD [a]

TABLE 6.3-4 (concluded)

SCAQMD Proposed Control Measure under Alternative 3

Number	Title	Emission Reductions (tons/day) (2023/2031)
BCM-03	Further Emission Reductions from Paved Road Dust Sources [PM]	TBD [a]
BCM-04	Emission Reductions from Manure Management Strategies [NH3]	TBD [a]
BCM-05	Ammonia Emission Reductions from NOx Controls [NH3]	TBD [a]
BCM-06	Emission Reductions from Abrasive Blasting Operations [PM]	TBD [a]
BCM-07	Emission Reductions from Stone Grinding, Cutting and Polishing Operations [PM]	TBD [a]
BCM-08	Further Emission Reductions from Agricultural, Prescribed and Training Burning [PM]	TBD [a]
BCM-09	Further Emission Reductions from Wood-Burning Fireplaces and Wood Stoves [PM]	TBD [a]
BCM-10	Emission Reductions from Greenwaste Composting [VOC, NH3]	0.1 / 0.1 [NH3]
SCAQMD Toxic Air Contamination Measures		
TXM-01	Control of Metal Particulate from Metal Grinding Operations	TBD
TXM-02	Control of Toxic Metal Particulate Emissions from Plating and Anodizing Operations	TBD
TXM-03	Control of Hexavalent Chrome from Chrome Spraying Operations	TBD
TXM-04	Control of Toxic Metal Particulate Emissions from Contaminated Soil	TBD
TXM-05	Control of Toxic Metal Particulate Emissions from Laser Plasma Cutting	TBD
TXM-06	Control of Toxic Emissions from Metal Melting Facilities	TBD
TXM-07	Control of Lead Emissions from Stationary Sources	TBD
TXM-08	Control of Emissions from Chemical Stripping of Cured Coatings	TBD
TXM-09	Control of Emissions from Oil and Gas Well Activities	TBD

[a] TBD are reductions to be determined once the inventory and control approach are identified, and are not relied upon for attainment demonstration purposes.

[b] N/A are reductions that cannot be quantified due to the nature of the measure (e.g., outreach) or if the measure is designed to ensure reductions that have been assumed to occur will in fact occur.

[c] Corresponding VOC reductions from other measures.

Source: 2016 AQMP, Table 4-2.

TABLE 6.3-5

CARB Proposed Control Measure under Alternative 3

CM Number	Title	Action	Implementation Begins	2023 Reduction (tons/day)	2031 Reduction (tons/day)
On-Road Light-Duty					
ORLD-01	Advanced Clean Cars 2	2020	2026	-	0.6 (NOx) 0.3 (ROG)
ORLD-02	Lower In-Use Emission Performance Assessment	NA	ongoing	NYQ	NYQ
On-Road Heavy-Duty					
ORHD-01	Lower In-Use Emission Performance Level for Heavy-Duty Vehicles	2016	2017	NYQ	NYQ
ORHD-02	Low-NOx Engine Standard (California Only)	2017-2019	CA Implementation: 2023	-	5 (NOx – CA action)
Marine, Rail, and Aircraft Off-Road					
ORFIS-04	At-Berth Regulation Amendments	2017-2018	2022	0.3 (NOx) <0.1 (ROG)	1 (NOx) <0.1 (ROG)
Other Off-Road					
OFFS-01	Zero Emission Off-Road Forklift Regulation Phase 1	2020	2023	-	1 (NOx) 0.1 (ROG)
OFFS-05	Small Off-Road Engines	2018	2022	0.7 (NOx) 7 (ROG)	2 (NOx) 16 (ROG)
OFFS-06	Transport Refrigeration Units Used for Cold Storage	2017-2018	2020	NYQ	NYQ
OFFS-07	Low-Emission Diesel Requirement	By 2020	2023	0.6 (NOx)	2 (NOx)
Consumer Products					
CPP-01	Consumer Products Program	2019-2021	2020	-	5 (ROG)

NYQ means not yet quantified.

6.3.4 ALTERNATIVE 4: EXPANDED INCENTIVE FUNDING

Alternative 4 would expand the incentive funding programs to increase the penetration of cleaner vehicles and technologies, allowing for more emission reductions and possibly earlier attainment of ambient air quality standards. Depending on the method of funding, current incentive costs are in the range of 4.25 to 15.8 billion dollars. Under this alternative it would be assumed that additional incentive funding sources would be found. This alternative has the opportunity to provide for more emission reductions and ease the need for additional regulatory action. However, the attainment goals would still need to be achieved as expeditiously as practicable.

6.4 ALTERNATIVES ANALYSIS

The following subsections include the same environmental topic areas evaluated for the 2016 AQMP. Under each environmental topic area, impacts and significance conclusions are summarized for the 2016 AQMP. In addition, potential impacts generated by each alternative to that environmental topic are described, a significance determination is made for the alternative, and environmental impacts from each alternative are compared to the environmental impacts identified for the 2016 AQMP.

6.4.1 AIR QUALITY

The potential air quality impacts from implementing the proposed project and project alternatives were evaluated. The following sections provide a summary of potential air quality impacts from the proposed project and evaluate potential air quality impacts from each alternative relative to the proposed project.

6.4.1.1 Proposed Project Impacts

The air quality impacts analysis concluded that the federal annual PM2.5 standards are predicted to be achieved in 2023 with implementation of the proposed ozone strategy. With only the non-182(e)(5) measure reductions, the annual PM2.5 standard would not be attained in 2021 (attainment date for moderate nonattainment areas). However, if the ozone strategy is fully implemented by 2023, both the federal and California annual PM2.5 standards could be achieved by 2023 under the proposed project scenario (see Section 4.1, Figure 4.1-3).

The carrying capacities, the maximum allowable NOx emissions to meet ozone standards, are estimated to be 150 tons/day NOx in 2023, and 100 tons/day NOx in 2031. NOx reductions of approximately 43 percent and 55 percent from the baseline levels are needed in 2023 and 2031, respectively. Approximately 16 percent NOx reductions from the 2022 baseline is needed to meet the revoked 1997 1-hour ozone standard by 2022, confirming that the 8-hour standard is a more stringent form than the 1-hour standard. Air quality modeling demonstrated that the strategies in the 2016 AQMP developed for attainment of the 1997 and 2008 8-hour ozone standards by 2023 and 2032 will ensure attainment of the 1-hour standard by 2022.

The California standard for 8-hour ozone is 70 ppb, the same level as the 2015 revised federal 8-hour ozone standard. This state standard will not be achieved by 2031. Preliminary analysis suggests additional emission reductions beyond the level required in 2031 are needed to meet the 70 ppb standard (see Section 4.1, Figure 4.1-4).

It should be noted that 2012 is the baseline year used for the emissions inventory to develop the control strategy and future baseline emissions in the 2016 AQMP, however, the latest verifiable air quality data (from the approved monitoring stations) is from 2015, which can be found in Chapter 2 of the 2016 AQMP and Chapter 3 (Existing Setting) of the Draft Program EIR. The most recent environmental topic data is from 2016 for the CEQA baseline in determining environmental impacts because that was time of the release of the NOP/IS in accordance with CEQA requirements.

The air quality analysis concluded that significant adverse construction air quality impacts could be created by the proposed project as construction activities needed to implement the 2016 AQMP control measures would exceed the SCAQMD's applicable significance thresholds. Mitigation measures were identified, but air quality impacts from construction would likely remain significant.

As noted above, the 2016 AQMP is designed to reduce criteria pollutants to meet federal air quality standards along with reductions in toxic risk and reductions in GHG emissions. Thus, there is an overall air quality benefit. The 2016 AQMP does have the potential to have a significant impact on energy demand. However the existing and future air quality and GHG rules and regulations are expected to minimize operational emissions associated with increased generation of electricity and the electricity providers have committed to meeting the increased energy demand while complying with applicable regulations; therefore, the 2016 AQMP control measures are not likely to generate significant adverse air quality impacts. In addition, future energy sources are increasingly being generated by renewable resources. One example is approximately 700 MW of electricity is now generated by solar projects in the four-county region[2].

Under the proposed project, no significant operational air quality impacts are expected from control of stationary sources, the change to the use of lower VOC materials, emissions from cleaner if not zero-emitting mobile sources, or miscellaneous emissions. Potential impacts associated with implementing the proposed project are expected to be an overall reduction in TAC emissions and GHG emissions, providing an environmental benefit. For the complete analysis of air quality impacts from the proposed project, refer to Section 4.2 – Air Quality.

6.4.1.2 No Project Alternative

Under Alternative 1, the black box measures from the 2007 AQMP and the yet-to-be implemented control measures from the 2012 AQMP would continue to be identified, adopted and implemented (see Table 6.3-1). The continuing implementation of these measures would generate construction impacts but not as many adverse impacts from the 2016 AQMP since there are less to implement. The one variable is what will constitute long-term measures in the future. Since the future technologies have not been identified or defined, it would be speculative to assume the construction air quality impacts from the long-term measures at this time. The construction air quality impacts from the 2012 AQMP were determined to be significant, however, the No Project

[2] https://www.californiasolarstatistics.ca.gov/reports/locale_stats/

Alternative is requiring what has already been adopted and analyzed to be implemented. Thus, the construction air quality impacts from not taking new action or proposing new control measures will not change the existing construction air quality baseline and thus, the construction air quality impacts from Alternative 1 are less than significant.

On the operational side, it is expected that air quality will continue to improve under Alternative 1 because of the adoption and implementation by the SCAQMD and CARB of the already adopted 2012 AQMP control measures, however the improvement would only attain the 1997 8-hour ozone standard (80 ppb). More measures would be needed under Alternative 1 to attain the 2008 8-hour ozone standard (75 ppb) but the No Project Alternative is not proposing any additional control measures. Thus, while Alternative 1 reduces criteria pollutant emissions and corresponding toxics and GHGs, the benefit will be less than what is accomplished with the proposed project.

6.4.1.3 Alternative 2 – Mobile Source Reductions Only

Under Alternative 2, no SCAQMD stationary source control measures would be implemented. Only the mobile source and consumer products control measures proposed by CARB and localized mobile source measures proposed by the SCAQMD would be implemented. Under this alternative, the 19971-hour ozone standard (120 ppb) and the 1997 8-hour ozone standard (80 ppb) could be met by 2022 and 2023, respectively, without reliance on the stationary source control measures. However, the 2008 8-hour ozone standard (75 ppb) would not be met without the implementation of the stationary source control measures. To make this alternative viable, the shortfall in NOx emission reductions would be classified as CAA §182(e)(5) measures. As compared to the proposed project, there would be less overall operational air quality, toxics and GHG benefits, but the impacts from construction would be reduced albeit still likely significant.

6.4.1.4 Alternative 3 – CARB or SCAQMD Regulation Only

Alternative 3 is designed to implement only traditional regulatory control measures and co-benefit measures. These measures are being proposed by both SCAQMD and CARB for stationary, area and mobile sources, and includes some measures regulating federal sources. The shortfall of NOx emission reductions needed to demonstrate attainment the ozone standards would be fulfilled by new proposed control strategies or classified as CAA §182(e)(5) measures. The latter would have speculative air quality impacts since the actual future technologies have not been identified or defined. However, the air quality impacts from the new proposed control strategies can be evaluated. Most of the proposals involve mobile sources that have limited construction impacts and beneficial operational impacts. Zero emission space heating technology would take place at new construction locations so no change from the baseline since there would be delivery and installation of natural gas heater without the proposed measure. Implementation of the proposed project regulatory measures will still generate adverse construction air quality impacts and provide operational air quality benefits. As compared to the proposed project, Alternative 3 would still have significant construction impacts, but less than the proposed project and there would be less overall operational air quality, toxics and GHG benefits.

6.4.1.5 Alternative 4 – Expanded Incentive Funding

Alternative 4 would expand the incentive funding to increase the penetration of cleaner vehicles and technologies, allowing for potentially more emission reductions. With more potential projects to be funded, the air quality construction impacts under Alternative 4 would be greater than the proposed project. However, greater emission reductions would be expected, thus more air quality, toxics, and GHG benefits than the proposed project.

6.4.2 ENERGY

The potential direct and indirect energy impacts from implementing the proposed project and project alternatives were evaluated. The following subsections provide a summary of potential direct and indirect energy impacts from the proposed project and evaluate potential direct and indirect energy impacts from each alternative relative to the proposed project.

6.4.2.1 Proposed Project Impacts

The environmental analysis for the proposed project concluded that the 2016 AQMP could result in a substantial increase in electricity demand that was concluded to be significant. No significant impacts were identified for natural gas supplies, petroleum fuels, or alternative energy demands. The proposed project is expected to decrease the use of fossil fuels and increase the reliance on renewable resources providing a beneficial long-term operational impact on energy conservation. For the complete analysis of energy impacts from the 2016 AQMP, refer to Section 4.3 – Energy.

6.4.2.2 Alternative 1 - No Project Alternative

No new control measures would be implemented under the No Project Alternative, however, the No Project Alternative would continue to implement control measures in the 2012 AQMP not yet adopted and define the long-term measures ("black box") in the 2007 AQMP to demonstrate attainment of the 1997 8-hour ozone standard at 80 ppb. However, since the future technologies have not been identified or defined, it would be speculative to assume the energy impacts from the long-term measures at this time. The energy demand impacts from the 2012 AQMP were determined to be significant; however, the No Project Alternative would not require beyond what has already been adopted and analyzed to be implemented. Thus, the energy impacts from not taking new action or proposing new control measures in Alternative 1 are less than significant.

6.4.2.3 Alternative 2 - Mobile Source Reduction Only

Under Alternative 2, no SCAQMD stationary source control measures would be implemented. Only the mobile source and consumer products control measures proposed by CARB and localized mobile source measures proposed by the SCAQMD would be implemented. The energy used under Alternative 2 would be slightly less as no stationary sources would be modified. However, virtually all of the electricity demand associated with the proposed project is associated with the increased penetration of partial-zero and zero emission vehicles. Therefore, the increase in electricity demand is expected to be about 10,227 GW-hr in 2023 and 18,029 GW-hr in 2031, which represents an increase in electricity use of 7.8 to 12.7 percent, which is deemed to be significant. This alternative would only eliminate CMB-01, the electrification of some stationary sources. Therefore, electricity demand would be less, but still is expected to be significant.

Alternative 2 would be expected to generate slightly less impacts on other energy sources since no stationary sources would be impacted. Therefore, no significant impacts are expected for natural gas supplies, petroleum fuels, or alternative energy demands under Alternative 2.

6.4.2.4 Alternative 3 – CARB and SCAQMD Regulation Only

Alternative 3 is designed to implement only traditional regulatory control measures and co-benefit measures. These measures are being proposed by both SCAQMD and CARB for stationary, area and mobile sources, and includes some measures regulating federal sources. The shortfall of NOx emission reductions needed to demonstrate attainment the ozone standards would be fulfilled by new proposed control strategies or classified as CAA §182(e)(5) measures. The latter would have speculative energy impacts since the actual future technologies have not been identified or defined. However, the energy impacts from the new proposed control strategies can be evaluated. Most of the proposed new control measures seek a zero emission solution so there will be an increased need for electricity whether for a vehicle, lawn and garden equipment, or a stationary source. Implementation of the proposed project regulatory measures will still generate significant adverse energy demand impacts but less than the proposed project since incentive-based measures would not be implemented.
The energy impacts under Alternative 3 are also expected to be less than the proposed project because some mobile source control measures that rely on incentives would not be implemented.

The demands for electricity under Alternative 3 could be partially offset by charging equipment (e.g., electric vehicles) at night when the electricity demand is low, thus minimizing impacts on peak electricity demands. .

Alternative 3 is expected to result in less energy impacts than the proposed project as fewer control measures would be implemented (no control measures with incentives). Therefore, as with the proposed project, Alternative 3 is not expected to result in significant impacts on natural gas supplies, petroleum fuels, or alternative energy resources.

6.4.2.5 Alternative 4 – Expanded Incentive Funding

Under Alternative 4, the electricity use would be the same or more as the increased funding could allow increased penetration of more partial-zero and zero emission vehicles than the proposed project; therefore, the electricity demand impacts are significant under Alternative 4 and likely more severe. As with the proposed project, no significant impacts are expected for natural gas supplies, petroleum fuels, or alternative energy demands under Alternative 4. Alternative 4 could decrease the use of petroleum fuels even more than the proposed project, providing a beneficial long term operational impact on energy conservation.

6.4.3 HAZARDS AND HAZARDOUS MATERIALS

The potential hazards and hazardous materials impacts from implementing the proposed project and project alternatives were evaluated. The following subsections provide a summary of potential hazards and hazardous materials impacts from the proposed project and evaluate potential hazards and hazardous materials impacts from each alternative relative to the project.

6.4.3.1 Proposed Project Impacts

The fire hazard impacts associated with reformulated coatings, solvents, and consumer products in the 2016 AQMP are expected to be significant prior to mitigation, as more flammable materials may be used. The hazard impacts associated with the transport of LNG are potentially significant. The hazard impacts associated with using ethanol and ethanol blends, CNG, LNG, LPG, biodiesel/renewable fuels, hydrogen, electric/hybrids as an alternative fuel are expected to be less than significant.

The hazards associated with the use of LNG and ammonia in air pollution control equipment that may be used to comply with some of the proposed project control measures are potentially significant for a transportation release of ammonia and potentially significant as an ammonia tank rupture at a non-refinery facility may result in off-site impacts to sensitive receptors.

The hazards associated with the use of ammonia in air pollution control equipment that may be installed as part of the proposed project control measures is less than significant for water quality impacts due to existing regulations and spill containment and control requirements; less than significant for the use of catalysts; and less than significant for the use of caustic materials. The hazards associated with increased use of the acidifier SBS are also expected to be less than significant. For the complete analysis of hazards and hazardous materials impacts from the 2016 AQMP, refer to Section 4.4 – Hazards and Hazardous Materials.

6.4.3.2 Alternative 1 - No Project Alternative

No new control measures would be implemented under the No Project Alternative, however, the No Project Alternative would continue to implement control measures in the 2012 AQMP not yet adopted and define the long-term measures ("black box") in the 2007 AQMP to demonstrate attainment of the 1997 8-hour ozone standard at 80 ppb. However, since the future technologies have not been identified or defined, it would be speculative to assume the hazards impacts from the long-term measures at this time. The fire hazards and risk of upset impacts from the 2012 AQMP were determined to be significant, however, the No Project Alternative would not requiring beyond what has already been adopted and analyzed to be implemented. Thus, the hazards impacts from not taking new action or proposing new control measures in Alternative 1 are less than significant.

6.4.3.3 Alternative 2 - Mobile Source Reduction Only

Alternative 2 would eliminate the stationary source control measures and some of the related hazards. The fire hazard impacts associated with reformulated coatings, solvents, and consumer products in the proposed project are expected to be significant however, these hazardous would be eliminated under Alternative 2 as no reformulated product control measures would be implemented. The hazard impacts associated with the transport of LNG are potentially significant and would remain significant under Alternative 2 as LNG could be used as a fuel source. The hazard impacts associated with using ethanol and ethanol blends, CNG, LNG, LPG, biodiesel/renewable fuels, hydrogen, electric/hybrids as an alternative fuel are expected to be less than significant under the proposed project and they would be the same under Alternative 2 and would remain less than significant.

The significant impacts associated with the use of ammonia in air pollution control equipment that may be used to comply with some of the proposed project control measures would be eliminated under Alternative 2 as control measures for stationary sources would be eliminated. Alternative 2 would also eliminate the control measures that could increase the use of catalysts, caustic materials or the SBS acidifier.

6.4.3.4 Alternative 3 – CARB or SCAQMD Regulation Only

Alternative 3 is designed to implement only traditional regulatory control measures and co-benefit measures. These measures are being proposed by both SCAQMD and CARB for stationary, area and mobile sources, and includes some measures regulating federal sources. The shortfall of NOx emission reductions needed to demonstrate attainment the ozone standards would be fulfilled by new proposed control strategies or classified as CAA §182(e)(5) measures. The latter would have speculative hazards impacts since the actual future technologies have not been identified or defined. However, the hazards impacts from the new proposed control strategies can be evaluated. Most of the proposed control measures involve zero-emission mobile sources and space heating that would have limited hazard impacts. However, depending on the alternative fuel used in the mobile sources, hazards has a potential impact. That impact is discussed in more detail in upcoming paragraphs. Implementation of the proposed project regulatory measures will still generate adverse hazards impacts but less than the proposed project since incentive-based measures would not be implemented.

The significant fire hazard impacts associated with reformulated coatings, solvents, and consumer products are expected to remain under Alternative 3 as most of the stationary source measures would be included, including the potential reformulation of products with low VOC materials.

The significant hazard impacts associated with the transport of LNG as an alternative fuel for vehicles and equipment are likely to be less than significant under Alternative 3 as most of the mobile source control measures would not move forward, including those that incentivize the use of partial-zero and zero emission mobile sources. The hazard impacts associated with using ethanol and ethanol blends, CNG, LNG, LPG, biodiesel/renewable fuels, hydrogen, electric/hybrids as an alternative fuel are expected to be less than significant under the proposed project and they would remain less than significant under Alternative 3.

The significant hazards from transportation release and tank rupture at a non-refinery facility associated with the use of ammonia in air pollution control equipment remain significant under Alternative 3 since those control measures requiring the use of NH3 would still be implemented.

The hazards associated with the use of ammonia in air pollution control equipment that may be installed as part of the proposed project control measures would still be implemented under Alternative 3. Therefore, the water quality impacts would be less than significant due to existing regulations and spill containment and control requirements; less than significant for the use of catalysts; and less than significant for the use of caustic materials. The hazards associated with increased use of the acidifier SBS are also expected to be less than significant under Alternative 3.

6.4.3.5 Alternative 4 – Expanded Incentive Funding

Alternative 4 would expand incentive funding and expand the penetration of cleaner technologies and would be expected to result in similar hazard impacts as the proposed projects. The fire hazard impacts associated with reformulated coatings, solvents, and consumer products would be the same or worse under Alternative 4. The hazard impacts associated with the transport of LNG are expected to be significant under Alternative 4. The hazard impacts associated with using ethanol and ethanol blends, CNG, LNG, LPG, biodiesel/renewable fuels, hydrogen, electric/hybrids as an alternative fuel are expected to be less than significant under the proposed project and they would be expected to remain less than significant under Alternative 4.

Under Alternative 4, the hazards associated with the use of ammonia in air pollution control equipment will continue to be significant and worse for a transportation release of ammonia and potentially significant as an ammonia tank rupture at a non-refinery facility may result in off-site impacts to sensitive receptors, since the same or more control measures would be implemented compared to the proposed project.

The hazards associated with the proposed project for the use of ammonia in air pollution control equipment (less than significant for water quality impacts due to existing regulations and spill containment and control requirements); the use of catalysts (less than significant); and the use of caustic materials (less than significant), are also expected to be the same or worse under Alternative 4 as the same or more control measures would be implemented. The hazards associated with increased use of the acidifier SBS are also expected to be less than significant for both the proposed project and Alternative 4.

6.4.4 HYDROLOGY AND WATER QUALITY

The potential hydrology and water quality impacts from implementing the proposed project and project alternatives were evaluated. The following subsections provide a summary of potential hydrology and water quality impacts from the proposed project and evaluate potential hydrology and water quality impacts from each alternative relative to the proposed project.

6.4.4.1 Proposed Project Impacts

It was concluded that wastewater treatment facilities are expected to have sufficient capacity to handle the estimated increase in wastewater that could be associated with proposed project control measures generated from reformulation of products and use of air pollution control equipment (e.g., wet ESPs and WGSs). Therefore, less than significant impacts associated with wastewater treatment or water quality is expected. Implementation of proposed project control measures is not expected to result in greater adverse water quality impacts from the use of alternative fuels than the use of conventional fuels and impacts would be less than significant. Less than significant adverse water quality impacts are expected from the increased use of EV and hybrid vehicles and the associated increase in battery use and disposal.

Water demand associated with the manufacture and use of waterborne coatings, solvents, and other consumer products, and add-on air pollution control technologies that may be required to comply with the proposed project control measures, such as wet ESPs and WGSs, are potentially significant as they would exceed SCAQMD's water demand significance thresholds.

SBS is not a hazardous or toxic chemical and is used to treat drinking water. Therefore, the use of SBS is expected to create less than significant water quality impacts. Finally, potential spills associated with ammonia are expected to be contained on-site due to the requirement for secondary spill containment devices and berms and are expected to be less than significant. For the complete analysis of hydrology and water quality impacts from the proposed project, refer to Section 4.5 – Hydrology and Water Quality.

6.4.4.2 Alternative 1 - No Project Alternative

No new control measures would be implemented under the No Project Alternative, however, the No Project Alternative would continue to implement control measures in the 2012 AQMP not yet adopted and define the long-term measures ("black box") in the 2007 AQMP to demonstrate attainment of the 1997 8-hour ozone standard at 80 ppb. However, since the future technologies have not been identified or defined, it would be speculative to assume the hydrology impacts from the long-term measures at this time. The water demand impacts from the 2012 AQMP were determined to be significant, however, the No Project Alternative would not requiring beyond what has already been adopted and analyzed to be implemented. Thus, the hydrology impacts from not taking new action or proposing new control measures in Alternative 1 are less than significant.

6.4.4.3 Alternative 2 - Mobile Source Reduction Only

Under Alternative 2, no SCAQMD stationary source control measures would be implemented. Only the mobile source and consumer products control measures proposed by CARB's SIP Strategy and localized mobile source measures proposed by SCAQMD would be implemented. The increased water demand and wastewater discharges associated with the proposed project is generated by the stationary source and consumer products measures. Therefore, the potentially significant increase in water demand associated with the proposed project would be substantially less under Alternative 2 but not fully eliminated since consumer products will still be implemented because they are part of CARB's SIP Strategy. Water quality impacts from the use of alternative fuels is not expected to be greater than from the use of conventional fuels and impacts would be less than significant under Alternative 2. Less than significant adverse water quality impacts would also be expected under Alternative 2 from the increased use of EV and hybrid vehicles and the associated increase in battery use and disposal. Finally, Alternative 2 would also eliminate the use of the acidifier SBS so no additional water quality impacts would be associated with its use.

6.4.4.4 Alternative 3 – CARB and SCAQMD Regulation Only

Alternative 3 is designed to implement only traditional regulatory control measures and co-benefit measures. These measures are being proposed by both SCAQMD and CARB for stationary, area and mobile sources, and includes some measures regulating federal sources. The shortfall of NOx emission reductions needed to demonstrate attainment of the ozone standards would be fulfilled by new proposed control strategies or classified as CAA §182(e)(5) measures. The latter would have speculative hydrology impacts since the actual future technologies have not been identified or defined. However, the hydrology impacts from the new proposed control strategies can be evaluated. The primary hydrology impact would result from increased solar technology that requires periodic washing to maintain effectiveness. Implementation of the proposed project regulatory measures will still generate adverse hydrology impacts but less than the proposed project since incentive-based measures would not be implemented.

It was concluded that wastewater treatment facilities are expected to have sufficient capacity to handle the estimated increase in wastewater that could be associated with proposed project control measures generated from reformulation of products and use of air pollution control equipment (e.g., wet ESPs and WGSs). Therefore, less than significant impacts associated with wastewater treatment or water quality is expected under Alternative 3, as most of the stationary source control measures would still be implemented. Implementation of proposed project control measures, as well as the control measures under Alternative 3, is not expected to result in greater adverse water quality impacts from the use of alternative fuels than the use of conventional fuels and impacts would be less than significant. Under Alternative 3, these impacts would be less as there would be less penetration of partial-zero and zero emission vehicles.

Water demand associated with the manufacture and use of waterborne coatings, solvents, and other consumer products, and add-on air pollution control technologies that may be required to comply with the proposed project control measures as well as that control measures under Alternative 3, such as wet ESPs and WGSs, are potentially significant as they could exceed SCAQMD water demand significance thresholds.

SBS is not a hazardous or toxic chemical and is used to treat drinking water. Therefore, the use of SBS is expected to create less than significant water quality impacts under both the proposed project and Alternative 3. Finally, potential spills associated with ammonia are expected to be contained on-site due to the requirement for secondary spill containment devices and berms and are expected to be less than significant under both the proposed project and Alternative 3.

6.4.4.5 Alternative 4 – Expanded Incentive Funding

The control measures implemented under Alternative 4 would be the same or more than the control measures implemented under the proposed project so that the hydrology and water quality impacts are expected to be the same.

Wastewater treatment facilities are expected to have sufficient capacity to handle the estimated increase in wastewater that could be associated with proposed project control measures generated from reformulation of products and use of air pollution control equipment (e.g., wet ESPs and

WGSs). Therefore, less than significant impacts associated with wastewater treatment or water quality is expected. Implementation of proposed project control measures is not expected to result in greater adverse water quality impacts from the use of alternative fuels than the use of conventional fuels and impacts would be less than significant. Less than significant adverse water quality impacts are expected from the increased use of EV and hybrid vehicles and the associated increase in battery use and disposal. The same or worse conclusions would also be expected under Alternative 4.

Water demand associated with the manufacture and use of waterborne coatings, solvents, and other consumer products, and add-on air pollution control technologies that may be required to comply with the proposed project control measures, such as wet ESPs and WGSs, are potentially significant as they would exceed SCAQMD water demand significance thresholds.

Finally, SBS is not a hazardous or toxic chemical and is used to treat drinking water. Therefore, the use of SBS is expected to create less than significant water quality impacts. Finally, potential spills associated with ammonia are expected to be contained on-site due to the requirement for secondary spill containment devices and berms and are expected to be less than significant. The same or worse conclusions would be expected under Alternative 4.

6.4.5 NOISE

The potential noise impacts from implementing the proposed project and project alternatives were evaluated. The following subsections provide a summary of potential noise impacts from the 2016 AQMP and evaluate potential noise impacts from each alternative relative to the 2016 AQMP.

6.4.5.1 Proposed Project Impacts

Construction Impacts: Implementation of the proposed project control measures associated with air pollution control technologies and exhaust standards would not result in noise and vibration impacts because construction activities would occur within appropriately zoned industrial and commercial areas, impacts would be temporary and limited to construction activities, and construction noise/vibration impacts to sensitive receptors would not be expected.

Operational Impacts: Implementation of the proposed project control measures is not expected to result in significant adverse operational noise impacts because the proposed project control measures typically affect existing commercial or industrial facilities typically located in appropriately zoned industrial or commercial areas. It is not expected that modifications to install air pollution control equipment would substantially increase ambient noise levels in the area, either permanently or intermittently, or expose people to excessive noise levels that would be noticeable above and beyond existing ambient levels. Although overhead catenary lines could be installed to comply with certain control measures, these lines would be installed along existing roadways and transportation corridors and as such would not result in the construction of new roadways or corridors. Further, the increasing operation of electric vehicles and equipment will lessen the noise typically experienced with combustion vehicles and equipment. For the complete analysis of noise impacts from the 2016 AQMP, refer to Section 4.6 – Noise.

6.4.5.2 Alternative 1 - No Project Alternative

No new control measures would be implemented under the No Project Alternative, however, the No Project Alternative would continue to implement control measures in the 2012 AQMP not yet adopted and define the long-term measures ("black box") in the 2007 AQMP to demonstrate attainment of the 1997 8-hour ozone standard at 80 ppb. However, since the future technologies have not been identified or defined, it would be speculative to assume the noise impacts from the long-term measures at this time. The construction noise impacts from the 2012 AQMP were determined to be significant, however, the No Project Alternative is requiring what has already been adopted and analyzed to be implemented. Thus, the noise impacts from not taking new action or proposing new control measures will not change the impacts from those identified for the 2012 AQMP.

6.4.5.3 Alternative 2 - Mobile Source Reduction Only

Under Alternative 2, no SCAQMD stationary source control measures would be implemented. Only the mobile source and consumer products control measures proposed by CARB and localized mobile source measures proposed by the SCAQMD would be implemented. Under Alternative 2, noise and vibration from construction activities would be reduced as no construction activities at stationary sources would occur. However, implementation of the Alternative 2 would still include control measures associated with construction of overhead catenary lines that could result in significant noise and vibration impacts due to the geographic proximity of sensitive receptors.

Under Alternative 2, noise and vibration from operational activities would be reduced as no new noise sources (e.g., air pollution control technologies) would be constructed at stationary sources. Overhead catenary lines could be installed to comply with certain mobile source control measures under Alternative 2, these lines would be installed along existing roadways and transportation corridors and as such would not result in the construction of new roadways or corridors or generate additional noise sources. In addition, Alternative 2 would increase the operation of electric vehicles that are traditionally quieter than combustion vehicles so operational noise will be reduced to less than significant.

6.4.5.4 Alternative 3 – CARB and SCAQMD Regulation Only

Alternative 3 is designed to implement only traditional regulatory control measures and co-benefit measures. These measures are being proposed by both SCAQMD and CARB for stationary, area and mobile sources, and includes some measures regulating federal sources. The shortfall of NOx emission reductions needed to demonstrate attainment the ozone standards would be fulfilled by new proposed control strategies or classified as CAA §182(e)(5) measures. The latter would have speculative noise impacts since the actual future technologies have not been identified or defined. However, the noise impacts from the new proposed control strategies can be evaluated. The construction noise impacts would not change at new development construction site, would increase at solar installation sites and unknown at the Ports depending on the project. The operation of zero-emitting vehicles and equipment is generally quieter than combustion vehicles and equipment. Implementation of the proposed project regulatory measures will still generate adverse noise impacts but less than the proposed project since incentive-based measures would not be implemented.

Construction Impacts: Implementation of the proposed project control measures, as well as the control measures under Alternative 3, associated with air pollution control technologies and exhaust standards would not result in noise and vibration impacts because construction activities would occur within appropriately zoned industrial and commercial areas, impacts would be temporary and limited to construction activities, and construction noise/vibration impacts to sensitive receptors would not be expected. The potential construction of overhead catenary lines would likely be eliminated under Alternative 3, therefore, the noise impacts associated with construction activities under the proposed project would be reduced to less than significant under Alternative 3.

Operational Impacts: Implementation of the proposed project, as well as the control measures under Alternative 3, is not expected to result in significant adverse operational noise impacts because the control measures that affect existing commercial or industrial facilities are expect to be located in appropriately zoned industrial or commercial areas. It is not expected that modifications to install air pollution control equipment would substantially increase ambient noise levels in the area, either permanently or intermittently, or expose people to excessive noise levels that would be noticeable above and beyond existing ambient levels. The potential construction of overhead catenary lines would likely be eliminated under Alternative 3 and the increased operation of electric vehicles that are traditionally quieter than combustion vehicles will reduce noise, therefore, the noise impacts associated with operational activities under the proposed project would be reduced to less than significant under Alternative 3.

6.4.5.5 Alternative 4 – Expanded Incentive Funding

The control measures implemented under Alternative 4 would be the same or more as the control measures implemented under the proposed project so that the noise impacts are expected to be the same.

Construction Impacts: Implementation of the proposed project control measures, as well as the control measures under Alternative 4, associated with air pollution control technologies and exhaust standards would not result in noise and vibration impacts because construction activities would occur within appropriately zoned industrial and commercial areas, impacts would be temporary and limited to construction activities, and construction noise/vibration impacts to sensitive receptors would not be expected. However, implementation of the proposed project or the Alternative 4 control measures associated with construction of overhead catenary lines could result in significant noise and vibration impacts due to the geographic proximity of sensitive receptors.

Operational Impacts: Implementation of the proposed project, as well as the Alternative 4 stationary source control measures, is not expected to result in significant adverse operational noise impacts because the control measures typically affect existing commercial or industrial facilities are typically located in appropriately zoned industrial or commercial areas. It is not expected that modifications to install air pollution control equipment would substantially increase ambient noise levels in the area, either permanently or intermittently, or expose people to excessive noise levels that would be noticeable above and beyond existing ambient levels. Although overhead catenary lines could be installed to comply with certain control measures, these lines would be installed along existing roadways and transportation corridors and as such would not result in the construction of new roadways or corridors and are not expected to generate additional noise impacts after the completion of construction. In addition, more electric vehicles are expected to be operated under Alternative 4 and since electric vehicles are traditionally quieter than combustion vehicles, the operational noise impacts are anticipated to be less than significant.

6.4.6 SOLID AND HAZARDOUS WASTE

The potential solid and hazardous waste impacts from implementing the proposed project and project alternatives were evaluated. The following subsections provide a summary of potential solid and hazardous waste impacts from the proposed project and evaluate potential solid and hazardous waste impacts from each alternative relative to the proposed project.

6.4.6.1 Proposed Project Impacts

Implementation of proposed project control measures would not significantly increase disposal of spent batteries, activated carbon, filters, and catalysts, and the early retirement of older equipment/vehicles and replacement with newer and lower emission technology equipment, would not generate significant additional waste. Because spent batteries are required to be and are largely recycled, the increased use of EVs and hybrid vehicles would not result in a significant increase in the illegal disposal of batteries. In addition, solid waste impacts due to proposed project air pollution control technologies would not be significant because spent carbon and catalysts are usually recycled and reused rather than disposed in landfills and filter waste would be small because the amount of material collected is small. Control measures that would require new equipment can require that retirement occurs as the life of the old equipment is exhausted and new equipment is put into service. For equipment that may be retired before the end of its useful life, that equipment may be reused in areas outside the Basin (with the exception of vehicles). Equipment with no remaining useful life is expected to be recycled for metal content. While these efforts assist in meeting goals reducing landfill waste the proposed project will advance deployment of high numbers of new vehicles and equipment and the assurance these will all be recycled, destroyed and not be sent to a landfill is uncertain. Furthermore, waste associated with construction of control measures could be sent to a landfill. So out of an abundance of caution significant solid/hazardous waste impacts were concluded to be significant due to implementation of the 2016 AQMP control measures. For the complete analysis of solid and hazardous waste impacts from the 2016 AQMP, refer to Section 4.7 – Solid and Hazardous Waste.

6.4.6.2 Alternative 1 - No Project Alternative

No new control measures would be implemented under the No Project Alternative, however, the No Project Alternative would continue to implement control measures in the 2012 AQMP not yet adopted and define the long-term measures ("black box") in the 2007 AQMP to demonstrate attainment of the 1997 8-hour ozone standard at 80 ppb. However, since the future technologies have not been identified or defined, it would be speculative to assume the solid and hazardous waste impacts from the long-term measures at this time. The solid and hazardous waste impacts from the 2012 AQMP were determined to be less than significant and since the No Project Alternative is not taking new action or proposing new control measures, the solid and hazardous waste impacts from Alternative 1 will remain less than significant.

6.4.6.3 Alternative 2 - Mobile Source Reduction Only

Under Alternative 2, no SCAQMD stationary source control measures would be implemented. Only the mobile source and consumer products control measures proposed in CARB's SIP Strategy and localized mobile source measures proposed by the SCAQMD would be implemented. Implementation of the proposed project control measures would increase disposal of spent batteries, activated carbon, filters, and catalysts, and the early retirement of older equipment/vehicles and replacement with newer and lower emission technology equipment, and thus could likely generate significant additional waste. The solid/hazardous waste generated under Alternative 2 is expected to be significant but less than the proposed project as there would not be any retirement of stationary source equipment.

Because spent batteries are required to be and are largely recycled, the increased use of EVs and hybrid vehicles would not result in a significant increase in the illegal disposal of batteries and the same would be true under Alternative 2. Control measures that would require new equipment can require that retirement occurs as the life of the old equipment is exhausted and new equipment is put into service. For equipment that may be retired before the end of its useful life, that equipment may be reused in areas outside the Basin (with the exception of vehicles). Equipment with no remaining useful life is expected to be recycled for metal content. However, it is speculative to estimate the volume of waste sent to landfills from project construction or some control measures such as car scrapping. Therefore, significant solid/hazardous waste impacts were anticipated due to implementation of the proposed project control measures and the same would be true under Alternative 2 although less waste would be generated.

6.4.6.4 Alternative 3 – CARB and SCAQMD Regulation Only

Alternative 3 is designed to implement only traditional regulatory control measures and co-benefit measures. These measures are being proposed by both SCAQMD and CARB for stationary, area and mobile sources, and includes some measures regulating federal sources. The shortfall of NOx emission reductions needed to demonstrate attainment the ozone standards would be fulfilled by new proposed control strategies or classified as CAA §182(e)(5) measures. The latter would have speculative solid/hazardous waste impacts since the actual future technologies have not been identified or defined. However, the solid/hazardous waste impacts from the new proposed control strategies can be evaluated. With the advanced replacement of fleet vehicles and equipment and changes at the Ports could generate adverse solid/hazardous waste impacts. Some of these products have the potential for recycling and others could burden a landfill. Implementation of the proposed project regulatory measures will still generate significant solid/hazardous waste impacts but less than the proposed project since incentive-based measures would not be implemented.

Implementation of proposed project control measures, as well as the control measures under Alternative 3, would increase disposal of spent batteries, activated carbon, filters, and catalysts, and the early retirement of older equipment/vehicles and replacement with newer and lower emission technology equipment, thus could generate significant additional waste. The 2016 AQMP Program EIR concluded that because spent batteries are required to be and are largely recycled, the increased use of EVs and hybrid vehicles would not result in a significant increase in the illegal disposal of batteries. Under Alternative 3, more lead-acid batteries are expected to remain in use. Lead-acid batteries are required to be recycled, reducing the potential for illegal disposal of batteries. However, the large number of vehicles and high-emitting equipment to be scrapped has the potential to result in significant adverse solid/hazardous waste impacts.

Solid waste impacts due to air pollution control technologies that may be installed under the proposed project or under Alternative 3, are not expected to be significant because spent carbon and catalysts are usually recycled and reused rather than disposed in landfills and filter waste would be small because the amount of material collected is small. The 2016 AQMP Program EIR concludes that control measures that would require new equipment can require that retirement occurs as the life of the old equipment is exhausted and new equipment is put into service. For equipment that may be retired before the end of its useful life, that equipment may be reused in areas outside the Basin (with the exception of vehicles). Equipment with no remaining useful life is expected to be recycled for metal content. Therefore, potential significant solid/hazardous waste impacts were identified due to implementation of the proposed project or Alternative 3 control measures.

6.4.6.5 Alternative 4 – Expanded Incentive Funding

The control measures implemented under Alternative 4 would be the same or more as the control measures implemented under the proposed project so that the solid and hazardous waste impacts are expected to be the same.

Implementation 2016 AQMP control measures would increase disposal of spent batteries, activated carbon, filters, and catalysts, and the early retirement of older equipment/vehicles and replacement with newer and lower emission technology equipment, thus could generate significant additional waste. Because spent batteries are required to be and are largely recycled, the increased use of EVs and hybrid vehicles would not result in a significant increase in the illegal disposal of batteries. In addition, spent carbon and catalysts are usually recycled and reused rather than disposed in landfills and filter waste would be small because the amount of material collected is small. Control measures that would require new equipment can require that retirement occurs as the life of the old equipment is exhausted and new equipment is put into service. For equipment that may be retired before the end of its useful life, that equipment may be reused in areas outside the Basin (with the exception of vehicles). Equipment with no remaining useful life is expected to be recycled for metal content. However, it is not conclusive that equipment will be put out of service and that the high number of vehicles or equipment will be scrapped as solid/hazardous waste so there is a potential for significant solid/hazardous waste impacts. .

6.4.7 TRANSPORTATION AND TRAFFIC

The transportation and traffic impacts from implementing the proposed project and project alternatives were evaluated. The following subsections provide a summary of potential hydrology and water quality impacts from the proposed project and evaluate potential hydrology and water quality impacts from each alternative relative to the proposed project.

6.4.7.1 Proposed Project Impacts

Implementation of the proposed project is not expected to result in potentially significant adverse transportation and traffic impacts because the proposed project control measures typically affect existing commercial or industrial facilities or would increase the penetration of zero emission and partial-zero emission vehicles and other mobile sources, which are not expected to generate new construction or substantially increase vehicle trips or vehicle miles traveled in the Basin, as they would place existing vehicles. However, some proposed project control measures could necessitate the construction of overhead catenary lines, within or adjacent to existing roadways, streets, freeways, and/or transportation corridors. Such construction activities would generate traffic associated with construction worker vehicles and trucks delivering equipment, materials and supplies to the project site during the duration of the construction activities. Construction activities, including potential lane closures, were considered to be significant.

Similarly, transportation infrastructure improvements pertaining to overhead catenary electrical lines could require the dedication of an existing lane exclusive to vehicles using the overhead catenary electrical lines or fixed guideway systems. The dedication of an existing lane would mean that other vehicles would have reduced access to available driving lanes. Thus, a reduction in the number of available lanes on a roadway to accommodate vehicles using the overhead catenary electrical lines could adversely affect traffic and congestion for all other vehicles on the road. Significant adverse operational traffic impacts are anticipated to be generated by the proposed project because no new streets, roads, freeways, or rail lines would be required and the proposed project control measures would apply to existing transportation corridors. For the complete analysis of Transportation and Traffic impacts from the 2016 AQMP, refer to Section 4.9 – Transportation and Traffic.

Alternative 1 - No Project Alternative

No new control measures would be implemented under the No Project Alternative, however, the No Project Alternative would continue to implement control measures in the 2012 AQMP not yet adopted and define the long-term measures ("black box") in the 2007 AQMP to demonstrate attainment of the 1997 8-hour ozone standard at 80 ppb. However, since the future technologies have not been identified or defined, it would be speculative to assume the traffic and transportation impacts from the long-term measures at this time. The construction and operational traffic impacts from the 2012 AQMP were determined to be significant, however, the No Project Alternative is not requiring beyond what has already been adopted and analyzed to be implemented. Thus, the traffic and transportation impacts will not change the traffic and transportation impacts identified in the 2012 AQMP, and therefore, remain significant.

6.4.7.3 Alternative 2 - Mobile Source Reduction Only

Under Alternative 2, no SCAQMD stationary source control measures would be implemented. Only the mobile source and consumer products control measures proposed by the CARB SIP Strategy and localized mobile source measures proposed by the SCAQMD would be implemented. Implementation of the mobile source control measures that increase the penetration of zero emission and partial-zero emission vehicles and other mobile sources would not be expected to generate new construction or substantially increase vehicle trips or vehicle miles traveled in the Basin as they would replace existing operating vehicles. However, some control measures in the 2016 AQMP and in Alternative 2 could necessitate the construction of overhead catenary lines, within or adjacent to existing roadways, streets, freeways, and/or transportation corridors. Such construction activities would generate traffic associated with construction worker vehicles and trucks delivering equipment, materials and supplies to the project site during the duration of the construction activities. Construction activities, including potential lane closures, are considered to be significant.

Similarly, transportation infrastructure improvements pertaining to overhead catenary electrical lines could require the dedication of an existing lane exclusive to vehicles using the overhead catenary electrical lines or fixed guideway systems. The dedication of an existing lane would mean that other vehicles would have reduced access to available driving lanes. Thus, a reduction in the number of available lanes on a roadway to accommodate vehicles using the overhead catenary electrical lines could significantly adversely affect traffic and congestion for all other vehicles on the road. Significant adverse operational traffic impacts are anticipated to be generated by the 2016 AQMP as well as under Alternative 2.

6.4.7.4 Alternative 3 – CARB and SCAQMD Regulation Only

Alternative 3 is designed to implement only traditional regulatory control measures and co-benefit measures. These measures are being proposed by both SCAQMD and CARB for stationary, area and mobile sources, and includes some measures regulating federal sources. The shortfall of NOx emission reductions needed to demonstrate attainment the ozone standards would be fulfilled by new proposed control strategies or classified as CAA §182(e)(5) measures. The latter would have speculative traffic/transportation impacts since the actual future technologies have not been identified or defined. However, the traffic/transportation impacts from the new proposed control strategies can be evaluated. Traffic will have adverse impacts as new solar technology is delivered and installed but other equipment, such as space heating and landscaping equipment will occur at new development so no change from baseline. The new measures are not foreseen to increase the traffic during operation. Implementation of the proposed project regulatory measures will still generate adverse traffic/transportation impacts but less than the proposed project since incentive-based measures would not be implemented.

Implementation of the 2016 AQMP was expected to result in significant traffic impacts associated with the construction and operation of overhead catenary lines. Construction activities could require the potential closures of lanes along existing transportation corridors and were consider to be significant. Significant adverse operational traffic impacts are anticipated to be generated by the 2016 AQMP because the catenary lines could reduce the number of lanes available to other traffic. Alternative 3 does not include the control measures that may incentivize or require the construction of overhead catenary lines. Therefore, the potentially significant traffic impacts under the proposed project would be reduced to less than significant.

6.4.7.5 Alternative 4 – Expanded Incentive Funding

The control measures implemented under Alternative 4 would be the same or more as the control measures implemented under the proposed project so that the transportation and traffic impacts are expected to be the same.

Some 2016 AQMP control measures could necessitate the construction of overhead catenary lines, within or adjacent to existing roadways, streets, freeways, and/or transportation corridors. Such construction activities would generate traffic associated with construction worker vehicles and trucks delivering equipment, materials and supplies to the project site during the duration of the construction activities. Construction activities, including potential lane closures, were considered to be significant.

Similarly, transportation infrastructure improvements pertaining to overhead catenary electrical lines could require the dedication of an existing lane exclusive to vehicles using the overhead catenary electrical lines or fixed guideway systems. The dedication of an existing lane would mean that other vehicles would have reduced access to available driving lanes. Thus, a reduction in the number of available lanes on a roadway to accommodate vehicles using the overhead catenary electrical lines could adversely affect traffic and congestion for all other vehicles on the road. Significant adverse operational traffic impacts are anticipated to be generated by the 2016 AQMP and would also occur under Alternative 4.

6.4.8 AESTHETICS

The potential aesthetics impacts from implementing the proposed project and project alternatives were evaluated. The following subsections provide a summary of potential aesthetic impacts from the 2016 AQMP and evaluate potential aesthetic impacts from each alternative relative to the 2016 AQMP.

6.4.8.1 Proposed Project

The potential aesthetic impacts from implementing the proposed project include the degradation of the visual character of a site from the installation of catenary lines and the use of bonnet emissions control systems at the ports, and glare from solar panels and cool roof systems. For the complete analysis of aesthetic impacts from the proposed project, refer to Section 4.10 – Aesthetics.

6.4.8.2 Alternative 1 - No Project Alternative

No new control measures would be implemented under the No Project Alternative, however, the No Project Alternative would continue to implement control measures in the 2012 AQMP not yet adopted and define the long-term measures ("black box") in the 2007 AQMP to demonstrate attainment of the 1997 8-hour ozone standard at 80 ppb. However, since the future technologies have not been identified or defined, it would be speculative to assume the aesthetics impacts from the long-term measures at this time. The aesthetics impacts from the 2012 AQMP were determined to be less than significant, however, the No Project Alternative is not taking new action or proposing new control measures and thus, the aesthetics impacts from Alternative 1 will be less than significant.

6.4.8.3 Alternative 2 - Mobile Source Reduction Only

Under Alternative 2, no SCAQMD stationary source control measures would be implemented. Only the mobile source and consumer products control measures proposed by CARB's SIP Strategy and localized mobile source measures proposed by the SCAQMD would be implemented. Under Alternative 2, aesthetic impacts would be similar as the proposed project as the control measure that could require the use of catenary lines and the use of bonnet technology for vessels would still be constructed, however other measures that involve the installation of solar panels and stationary source equipment with potential adverse aesthetic impacts are not included in this alternative. Therefore, aesthetic impacts would remain significant under Alternative 2, but less than the proposed project.

6.4.8.4 Alternative 3 – CARB and SCAQMD Regulation Only

Alternative 3 is designed to implement only traditional regulatory control measures and co-benefit measures. These measures are being proposed by both SCAQMD and CARB for stationary, area and mobile sources, and includes some measures regulating federal sources. The shortfall of NOx emission reductions needed to demonstrate attainment of the ozone standards would be fulfilled by new proposed control strategies or classified as CAA §182(e)(5) measures. The latter would have speculative aesthetics impacts since the actual future technologies have not been identified or defined. However, the aesthetics impacts from the new proposed control strategies can be evaluated. Zero-emitting equipment and vehicles will improve visibility so an operational benefit to the aesthetics, although installation of solar panels could result in adverse aesthetics impacts. Implementation of the proposed project regulatory measures will still generate adverse aesthetics impacts but less than the proposed project since incentive-based measures would not be implemented.

Alternative 3 is expected to eliminate the potentially significant aesthetic impacts associated with the proposed project as the control measures that would incentivize or require the use of catenary lines would be eliminated however other measures that involve the installation of solar panels and stationary source equipment with potential adverse aesthetic impacts are not included in this alternative. Therefore, the potentially significant aesthetic impacts under the proposed project would remain significant under Alternative 3 but less than the proposed project.

6.4.8.5 Alternative 4 – Expanded Incentive Funding

Aesthetic impacts would be the same or more than the proposed project as the control measures that could require the use of catenary lines would still be constructed. Therefore, aesthetic impacts would remain significant under Alternative 4.

6.5 COMPARISON OF PROJECT ALTERNATIVES TO THE 2016 AQMP

Pursuant to CEQA Guidelines §15126.6 (d), "The EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project. A matrix displaying the major characteristics and significant environmental effects of each alternative may be used to summarize the comparison. If an alternative would cause one or more significant effects in addition to those that would be caused by the project as proposed, the significant effects of the alternative shall be discussed, but in less detail than the significant effects of the project as proposed." The sections above provide a comprehensive analysis of potential impacts generated by each project alternative and compares impacts to those generated by the 2016 AQMP. Table 6.5-1 provides a matrix displaying the major characteristics and significant environmental effects of each alternative compared to the 2016 AQMP.

TABLE 6.5-1

Comparison of the Project Alternatives to the Proposed 2012 AQMP

Environmental Topic	2016 AQMP	Alternative 1 No Project	Alternative 2 Mobile Source Reduction Only	Alternative 3 CARB / SCAQMD Regulation Only	Alternative 4 Expanded Incentive Funding
Air Quality					
Construction	**S**	**NS -** less than proposed project	**S** – less than proposed project	**S** – less than proposed project	**S** – more than proposed project
Operation	**NS**	**NS -** but less AQ benefit than proposed project	**NS** – less benefit than proposed project	**NS** – less benefit than proposed project	**NS** – more benefit than proposed project
Toxics	**NS**	**NS -** but less toxic reduction benefit than proposed project	**NS** – less benefit than proposed project	**NS** – less benefit than proposed project	**NS** – more benefit than proposed project
Greenhouse Gases	**NS**	**NS -** but less GHG reduction benefit than proposed project	**NS** – less benefit than proposed project	**NS** – less benefit than proposed project	**NS** – more benefit than proposed project
Energy					
Electricity Demand	**S**	**NS** – less than proposed project	**S** – less than proposed project	**S** – less than proposed project	**S** – more than proposed project
Natural Gas, Petroleum Fuels, Alternative Energy	**NS**	**NS** – less than proposed project	**NS** – less than proposed project	**NS** – less than proposed project	**NS** – more than proposed project
Hazards/Hazardous Materials					
Transport	**S**	**NS** – less than proposed project	**S** – less than proposed project	**S** – less than proposed project	**S** – more than proposed project
Risk of Upset	**S**	**NS** – less than proposed project	**S** – less than proposed project	**S** – less than proposed project	**S** – more than proposed project
Flammability/ Fire	**S**	**NS** – less than proposed project	**S** – less than proposed project	**S** – less than proposed project	**S** – more than proposed project
Haz Material Sites	**NS**	**NS** – less than proposed project	**NS** – less than proposed project	**NS** – less than proposed project	**NS** – more than proposed project
Proximity to School	**S**	**S** – less than proposed project	**S** – less than proposed project	**S** – less than proposed project	**S** – more than proposed project

TABLE 6.5-1 (concluded)

Comparison of the Project Alternatives to the Proposed 2012 AQMP

Environmental Topic	2016 AQMP	Alternative 1 No Project	Alternative 2 Mobile Source Reduction Only	Alternative 3 CARB / SCAQMD Regulation Only	Alternative 4 Expanded Incentive Funding
Hydrology and Water Quality					
Water Demand	**S**	**NS** – less than proposed project	**NS** – less than proposed project	**S** – less than proposed project	**S** – more than proposed project
Water Quality	**NS**	**NS** – equal to proposed project	**NS** – equal to proposed project	**NS** – equal to proposed project	**NS** – equal to proposed project
Noise					
Construction	**S**	**NS** – less than proposed project	**S** – less than proposed project	**NS** – less than proposed project	**S** – more than proposed project
Operation	**NS**	**NS** – less than proposed project	**NS** – less than proposed project	**NS** – less than proposed project	**NS** – more than proposed project
Solid/Hazardous Wastes					
Disposal at Landfill	**S**	**NS** – less than proposed project	**S** – less than proposed project	**S** – less than proposed project	**S** – more than proposed project
Traffic Transportation					
Construction	**S**	**NS** – less than proposed project	**S** – less than proposed project	**NS** – less than proposed project	**S** – more than proposed project
Operation	**S**	**NS** – less than proposed project	**S** – less than proposed project	**NS** – less than proposed project	**S** – more than proposed project
Aesthetics					
Visual Character	**S**	**NS** – less than proposed project	**S** – less than proposed project	**S** – less than proposed project	**S** – more than proposed project
Glare	**S**	**NS** – less than proposed project	**S** – less than proposed project	**S** – less than proposed project	**S** – more than proposed project

6.6 ENVIRONMENTALLY SUPERIOR AND LOWEST TOXIC ALTERNATIVE

Pursuant to CEQA Guidelines §15126.6(e)(2), if the environmentally superior alternative is the "no project" alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives. Alternative 1 (No Project Alternative), continued implementation of the 2007 and 2012 AQMPs is considered to be the environmentally superior alternative because it is not expected to generate any additional significant adverse impacts to any environmental topic areas beyond those identified for the 2007 and 2012 AQMPs. Alternative 1 was originally drafted to demonstrate compliance with the federal 1997 8-hour ozone standard (80 ppb) and PM2.5 standards but does not address attaining the 2008 federal 8-hour ozone standard (75 ppb).

Based on the above CEQA citation, since the No Project Alternative was deemed the environmentally superior alternative, an alternative from the remaining alternatives must be selected. The analysis of potential impacts from each of the project alternatives concludes that Alternative 2 (Mobile Source Reduction Only) is the environmentally superior alternative. This conclusion is based on the fact that removing the stationary source control measures eliminates small remaining NOx reductions needed to reach attainment, so less reductions would be classified as long-term or "black box" measures, generating more overall air quality benefit in the short-term. Alternative 3 (CARB and SCAQMD Regulation Only) would generate more potential secondary impacts as a result of additional control measures but would classify less long-term or "black box" measures as compared to Alternative 2. Therefore, the new and proposed project stationary and mobile sources that are implemented under Alternative 3 are more likely to have adverse secondary environmental impacts than the strategies in Alternative 2. The only exception is noise generated from the catenary projects to electrify heavy-duty trucks on the freeways that would be eliminated under Alternative 3. From an air quality perspective, electrifying the travel of high-emitting heavy-duty would greatly benefit Alternative 2 in overall air quality reductions, thus would be more environmentally superior. Depending on the amount of funding and the effectiveness of the incentive funding, Alternative 4 (Expanded Incentive Funding) theoretically has the potential to be environmentally superior as a result of more overall air quality benefit from more emission reduction projects but along with those project there is the potential for more secondary impacts from other environmental topics such as aesthetics, energy, hazards, water, noise, waste and traffic. The challenge is whether the additional air quality benefits outweigh the adverse secondary environmental impacts.

In accordance with SCAQMD's policy document Environmental Justice Program Enhancements for FY 2002-03, Enhancement II-1 recommends that all SCAQMD CEQA documents required to include an alternatives analysis, also include and identify a feasible project alternative with the lowest air toxics emissions. In other words, for any major equipment or process type under the scope of the proposed project that creates a significant environmental impact, at least one alternative, where feasible, shall be considered from a "least harmful" perspective with regard to hazardous or toxic air pollutants. It is expected that potential energy, hazards and hazardous materials, hydrology and water quality, and solid waste impacts associated with taking no further action and thus no potential secondary impacts, would be less under Alternative 1 (No Project Alternative) because it would avoid significant adverse impacts to all environmental topic areas evaluated compared to the remaining alternatives. Thus, from an air toxics perspective, when compared to the proposed project and the other alternatives under consideration, if implemented, Alternative 1 is considered the lowest toxic alternative. It should be noted however that the 2016 AQMP does include a toxic control strategy comprised of nine proposed measures. Depending on the effectiveness of the program as opposed to potential secondary impacts generated from those projects, the proposed project and remaining alternatives would reduce overall toxic risk. Since implementation of all nine toxic reduction measures would occur with the remaining alternatives, the least toxic alternative would be equivalent to the proposed project.

6.7 CONCLUSION

Of the project Alternatives, Alternative 1 would generate the least severe and fewest number of environmental impacts compared to the 2016 AQMP. However, compared to the other project alternatives, Alternative 1 would achieve the fewest of the project objectives (see Chapter 2 for the comprehensive list of objectives) and would not accomplish critical objectives such as demonstrating attainment of the 2006 24-hour PM2.5 standard (35 $\mu g/m^3$) (*Objective #3*), 2012 annual PM2.5 standard (12 $\mu g/m^3$) (*Objective #4*) and the 2008 8-hour ozone standard (75 ppb) (*Objective #5*) applying the latest SCAG's 2016 RTP information and CARB's 2014 EMFAC data (*Objective #6*). Without submitting a Plan that makes these demonstrations, the region is in violation of the Clean Air Act (CAA) and at risk for sanctions and consequences. Although not required by the CAA, other objectives not fulfilled by Alternative 1 include eliminating reliance on CAA§182(e)(5) measures to the extent feasible (*Objective #12*) , taking co-benefit reductions from other planning efforts (e.g., GHG reduction targets, energy efficiency and transportation) (*Objective #13*), developing a fair share reduction strategy with federal, state and local levels (*Objective #14*), seeking funding for incentive programs (*Objective #16*), and enhancing the socioeconomic analysis (*Objective #17*).

Alternative 2 would be expected to generate equivalent impacts to the proposed project in all environmental topic areas analyzed except water demand which is primarily generated from stationary sources that are not implemented under Alternative 2. The only exception is the consumer products control measure proposed and implemented by CARB's SIP Strategy. Therefore, the potentially significant increase in water demand associated with the proposed project would be substantially less under Alternative 2 but not fully eliminated since consumer products will still be implemented. More importantly, however, is that Alternative 2 will need to rely on classifying the emission reductions not achieve from stationary sources as long-term or "black box" measure in order to demonstrate attainment of the ozone and PM2.5 standards. This would not achieve the objective to eliminate reliance on future technologies (CAA §182(e)(5)) measures to the extent feasible.

Similarly, Alternative 3 would be expected to generate overall equivalent impacts to the proposed project in all environmental topic areas analyzed except construction noise expected from the construction of the catenary line for heavy-duty truck transport on freeways. Other actions will generate construction noise under Alternative 3 but not as significant as the proposed project. Alternative 3 proposes additional control measures that will benefit air quality equal to the proposed projects with no incentive measures, but could also rely on long-term or "black box" measures for any shortfall in attainment demonstration of the ozone and PM2.5 standards. Similar to Alternative 2, if this is the case, Alternative 3 would not achieve an important objective to eliminate reliance on future technologies (CAA §182(e)(5)) measures to the extent feasible.

As discussed earlier, Alternative 4 has the potential to be the environmentally superior alternative if the additional incentive funding is secured, the programs are more effective than the proposed project and the potential secondary impacts from the additional funded projects are outweighed by the additional emission reductions achieved, thus more overall air quality benefit. Alternative 4 achieves all the project objectives as does the proposed project.

Based on the above information and discussion, the proposed project has been proven to be the most effective project that achieves the all the project objectives relative to environmental impacts generated. While adverse secondary impacts will be difficult to avoid, mitigation measures are proposed and an overall air quality benefit will result along with reductions in toxics and GHGs. The proposed project will satisfy the CAA and not put the region in legal vulnerability that could harm the environment, communities and businesses.

CHAPTER 7

REFERENCES

7.1 References
7.2 Organizations and Persons Consulted

7.0 REFERENCES

7.1 REFERENCES

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CHAPTER 8

ACRONYMS

Acronyms

ACRONYMS

ABBREVIATION	DESCRIPTION
AAs	Administering Agencies
AB	Assembly Bill
AB32	Califonia's Global Warming Solutions Act of 2006
AB939	California Integrated Waste Management Act of 1989
AB 1807	Tanner Bill
AB2588	Air Toxic "Hot Spots" Information and Assessment Act
ACGIH	American Conference of Governmental Industrial Hygienists
AER	All Electric Range
af	acre-feet
AFDC	Alternative Fuels Data Center
AFV	Alternative Fuel Vehicles
AFY	acre-feet per year
AIR	Association of Irritated Residents
AMP	Alternative Marine Power
APS	Alternative Planning Strategy
AQMP	Air Quality Management Plan
AQREP	Air Quality-Related Energy Policy
ASTM	American Society for Testing and Materials
ASTM D56	Tagliabue Closed Cup standard
ASME	American Society of Mechanical Engineers
ATCM	Airborne Toxic Control Measure
ATCP	Air Toxics Control Plan
ATP	Active Transportation Program
ATSA	Aviation and Transportation Security Act
BACT	Best Available Control Technology
BACM	Best Available Control Measures
BCM	Best Control Measures
BARCT	Best Available Retrofit Control Technology
BART	Best Available Retrofit Technology
Basin	South Coast Air Basin
BLEVE	boiling liquid expanding vapor explosion
BLM	Bureau of Land Management
BMP	Best Management Practices
BNSF	Burlington Northern Santa Fe Railway
BOD	Bio-chemical Oxygen Demand
BPTCP	Bay Protection and Toxic Clean Up Plan
BRT	Bus Rapid Transit
BSER	Best System of Emission Reduction
BTA Document	Bicycle Transportation Account Compliance Document
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
BTSP	Bicycle Transportation Strategic Plan

Btu	British Thermal Units
Btu/hr	British Thermal Units per hour
CAA	Clean Air Act
CAAP	Clean Air Action Plan
CAFE	Corporate Average Fuel Economy
CalARP	California Accidental Release Prevention Program
CalEMA	California Emergency Management Agency
Cal/EPA	California Environmental Protection Agency
CALFED	Bay-Delta Program
CAL FIRE	California Department of Forestry and Fire Protection
CalRecycle	(formerly known as the California Integrated Waste Management Board)
Caltrans	California Department of Transportation
CalOSHA	California Occupational Safety and Health Administration
CARB	California Air Resources Board
CAA	Clean Air Act
CAAP	Clean Air Action Plan
CBSP	Commuter Bikeways Strategic Plan
CCAA	California Clean Air Act
CCC	California Coastal Commission
CCP	Clean Communities Plan
CCR	California Code of Regulations
CDF	California Department of Forestry and Fire Protection
CDPR	California Department of Parks and Recreation
CEC	California Energy Commission
CE-CERT	College of Engineering - Center for Environmental Research and Technology
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQA	California Environmental Quality Act
CFCs	Chloroflorocarbons
CFR	Code of Federal Regulations
CH_4	Methane
CHMIRS	California Hazardous Materials Incident Reporting System
CHP	California Highway Patrol
CHP	Combined Heating and Power
CII	Commercial Industrial and Institutional
CIP	Capital Improvement Program
CIWMB	California Integrated Waste Management Board
CIWMP	Countywide Integrated Waste Management Plan
CLWA	Castaic Lake Water Agency
CMAs	Congestion Management Agencies
CMB	Combustion Sources
CMPs	Congestion Management Programs
CMAQ	Community Multiscale Air Quality
CNEL	Community Noise Equivalent Level

CNG	Compressed Natural Gas
CNRA	California Natural Resources Agency
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO2e	CO2 equivalents
COD	Chemical oxygen Demand
COHb	Carboxyhemoglobin
CPUC	California Public Utilities Commission
CPSC	Consumer Products Safety Commission
CRA	Colorado River Aqueduct
CRWDA	Colorado River Water Delivery Agreement
CSI	California Solar Initiative
CSWRRA	California Solid Waste Reuse and Recycling Act
CTC	California Transportation Commission
CTIP	Cargo Theft Interdiction Program
CTP	California Transportation Plan
CTS	Coatings and Solvents
CUPA	Certified Unified Program Agency
CUWCC	California Urban Water Conservation Council
CVRP	Clean Vehicle Rebate Project
CVAG	Coachella Valley Association of Governments
CVRP	Clean Vehicles Rebate Pilot Program
CWA	Clean Water Act
CWAP	Clean Water Action Plan
CWM	Chemical Waste Management
dB	decibels
dBA	decibels (A-weighted)
DBP	Disinfection Byproducts
DDT	Dichlorodiphenyltrichloroethane
Delta	Sacramento-San Joaquin Delta
DFW	Department of Fish and Wildlife
DGS	dry gas scrubber
DHS	Department of Health Services
DHS	Department of Homeland Security
District	South Coast Air Quality Management District
DMA	Disaster Mitigation Act
DMC	dimethyl carbonate
DOT	Department of Transportation
DPF	Diesel Particulate Filters
DPM	Diesel Particulate Matter
DRRP	Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles (also known as the Diesel Risk Reduction Plan)
DRS	Disposal Reporting System
DTSC	California Department of Toxic Substances Control
DTIM	Direct Travel Impact Model

DWR	California Department of Water Resources
EAP	Emergency Action Plan
ECC	Energy and Climate Change Programs
EDMS	Emissions and Dispersion Modeling System
EFMP	Enhanced Fleet Modernization Program
EGUs	Electric Generating Units
EHS	Extremely Hazardous Substances
EIA	Energy Information Administration
EIP	Economic Incentive Programs
EIR	Environmental Impact Report
EISA	Energy Independence and Security Act of 2007
EJ	Environmental Justice
EJAG	Environmental Justice Advisory Group
EMFAC	Emission Factors Model
EMFAC 2011	2011 Emission Factors model
EMFAC 2014	2014 Emissions Factors Model
EMSW	Engineered Municipal Solid Waste
EMWD	Eastern Municipal Water District
EO	Executive Order
EOR	Enhanced Oil Recovery
EPA	Environmental Protection Agency
EPAct	Energy Policy Act
EPACT92	Energy Policy Act of 1992
EPCA	Energy Policy and Conservation Act of 1975
EPCRA	Emergency Planning and Community Right-to-Know Act
EPS	Emission Performance Standard
ERCs	emission reduction credits
ERPG	Emergency Response Planning Guideline
ERPG-2	Emergency Response Planning Guide Level 2
ERPG-3	Emergency Response Planning Guide Level 3
ESP	Electrostatic Precipitators
EVs	Electric Vehicles
E85	Ethanol
^{o}F	Degrees Fahrenheit
FAA	Federal Aviation Administration
FCCU	Fluid Catalytic Cracking Unit
FCEVs	fuel cell electric vehicles
FDA	Food and Drug Administration
FDDA	four dimensional data assimilation
FEMA	Federal Emergency Management Agency
FePo	iron phosphate
Fe_2O_3	iron oxide
FFVs	Flexible Fuel Vehicles
FHA	Federal Highway Administration
FHWA	Federal Highway Administration
FLX	Compliance Flexibility Programs

FMVSS	Federal Motor Vehicle Safety Standard
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
FTIP	Federal Transportation Improvement Program
FTIR	Fourier Transfer Infrared Spectroscopy
FUA	Fuel Use Act
FUG	Fugitive Emissions
FY	Fiscal Year
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GRAS	Generally Recognized As Safe
GVW	gross vehicle weight
GVWR	gross vehicle weight rating
GWh	gigawatt hours
g/bhp-hr	grams per brake horsepower hour
H_2	Hydrogen
H_2S	Hydrogen Sulfide
H_2SO_4	Sulfuric Acid
HAPs	Hazardous Air Pollutants
HCFCs	Hydrochlorofluorcarbons
HD Diesel	Heavy-Duty Diesel
HDRD	Hydrogenation Derived Renewable Diesel
HECW	High Efficiency Clothes Washers
HEPA	High Efficiency Particulate Air
HET	High Efficiency Toilet
HEV	Hybrid Efficiency Vehicle
HFCs	hydrofluorocarbons
HI	Hazard Index
HMGP	Hazard Mitigation Grant Program
HMTA	Hazardous Materials Transportation Act
HNO_3	Nitric Acid
HOT	High-Occupancy Toll
HOV	High Occupancy Vehicle
HQTA	High Quality Transit Areas
HRA	Health Risk Assessment
HOT	High-Occupancy Toll
HQTAs	High Quality Transit Areas
HUD	Housing and Urban Development
HVAC	Heating, Ventilation, Air Conditioning
HVIP	Hybrid Vehicle Incentives Project
HWCA	Hazardous Waste Control Act
HWMP	Hazardous Waste Management Plan
Hybrids	hybrid vehicles
Hz	Frequency
IARC	International Agency for Research on Cancer
ICEs	Internal Combustion Engines

ICTA	International Center for Technology Assessment
IDLH	Immediately Dangerous to Life and Health
IGR	Intergovernmental Review
IID	Imperial Irrigation District
IOUs	Investor Owned Utilities
IRWD	Irvine Ranch Water District
ISO	Independent System Operator
ISI Forecasting	Intra-seasonal to Inter-annual Climate Forecasting
ISPS	International Ship and Port Facility Security Code
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITS	Intelligent Transportation Systems
IWMD	Integrated Waste Management District
kW	Kilowatt
kWh	Kilowatt Hour
LAA	Los Angeles Aqueduct
LACDPW	Los Angeles County Department of Public Works
LACSD	Los Angeles County Sanitation Districts
LADPW	Los Angeles Department of Public Works
LADWP	Los Angeles Department of Water and Power
LAX	Los Angeles International Airport
LBGOD	Long Beach Gas & Oil Department
lbs	pounds
lbs/day	pounds per day
lbs/gal	pounds per gallon
lbs/hr	pounds per hour
LCFS	Low-Carbon Fuel Standard
LCP	Local Coastal Program
LDAR	Leak Detection and Repair
Ldn	Day/Night Noise Level
LEAs	Local Enforcement Agencies
LED	Light Emitting Diode
LEL	Lower Explosive Limit
LEPC	Local Emergency Planning Committee
LES	Laidlaw Environmental Services
LEV	Low Emission Vehicle
Leq	Equivalent Noise Level
Li-ion	lithium ion
Lmax	maximum measured noise level
LNG	Liquefied Natural Gas
LOS	Level of Service
LoTOxTM	Low Temperature Oxidation technology
LPG	Liquefied Petroleum Gas
LSE	load-serving entities
LUPs	land use plans
MAF	Million acre-feet
MAP	Million Annual Passengers

MAP-21	Moving Ahead for Progress in the 21st Century
MATES	Multiple Air Toxic Exposure Study
MATES II	Multiple Air Toxic Exposure Study II
MATES III	Multiple Air Toxic Exposure Study III
MATES IV	Multiple Air Toxic Exposure Study IV
MCLs	Maximum Containment Levels
MCS	Multiple Component Sources
MDAB	Mojave Desert Air Basin
MECA	Manufacturer's of Emission Controls Association
MEK	methyl ethyl ketone
Metro	Los Angeles County Metropolitan Transit Authority
mgd	million gallons per day
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
M&I	Municipal and Industrial
MIBK	methyl isobutyl ketone
MIR	Maximum Incremental Reactivity
MMTCO2e	million metric tons of carbon dioxide equivalent
MnO	manganese oxide spinel
MoO_3	molybdic anhydride
MOU	Memorandum of Understanding
MPOs	Metropolitan Planning Organizations
MTCO2e/year	CO2 equivalent emissions per year
MPO	Metropolitan Planning Organization
MSERC	Mobile Source Emission Reduction Credits
MRFs	Material Recovery Facilities
MS4s	municipal separate storm sewer systems
MTBE	methyl tertiary butyl ether
MW	megawatts
Metropolitan	Metropolitan Water District of Southern California
MWD	Metropolitan Water District
M85	Methanol
M&I	Municipal and Industrial
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NaOH	sodium hydroxide
Na_2CO_3	sodium carbonate
NCA	nickel-cobalt- aluminum
NCEP	National Centers for Environmental Prediction
NCM	nickel-cobalt-manganese
NCP	National Contingency Plan
NECPA	National Energy Conservation Policy Act
NEC	National Electric Code
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NEV	Neighborhood Electric Vehicles
NPDES	National Pollutant Discharge Elimination System
NFC	National Fire Codes

NFPA	National Fire Protection Association
NHTSA	National Highway Traffic Safety Administration
NH_4NO_3	ammonium nitrate
NH_4HSO_4	ammonium bisulfate
$(NH_4)_2SO_4$	ammonium sulfate
NiMH	nickel-metal hydride
NIOSH	National Institute of Occupational Safety and Health
NMFS	National Fisheries Service
N_2	Nitrogen
N_2O	Nitrous Oxide
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NOP	Notice of Preparation
NOP/IS	Notice of Preparation/Initial Study
NOx	Nitrogen Oxide
NS	No significant impacts
NSR	New Source Review
O_2	Oxygen
O_3	Ozone
OCHCA	Orange County Health Care Agency
OCSD	Orange County Sanitation District
OCTA	Orange County Transportation Authority
OCWD	Orange County Water District
ODS	Ozone Depleting Substances
ODSSH	Officially Designated State Scenic Highway
OEHHA	Office of Environmental Health Hazards Assessment
OEM	Original Engine Manufacturer
OHMS	Office of Hazardous Materials Safety
OPR	Office of Planning and Research
OSHA	Occupational Safety and Health Administration
PAHs	Polynuclear Aromatic Hydrocarbons
Pb	lead
PCB	Polychlorinated biphenyls
PEIR	Program Environmental Impact Report
PELs	Permissible Exposure Limits
PFCs	Perfluorocarbons
PG&E	Pacific Gas & Electric
PHMSA	Pipeline and Hazardous Materials Safety Administration
PM	Particulate Matter
PM2.5	particulate matter less than 2.5 microns equivalent aerodynamic diameter
PM10	particulate matter less than 10 microns equivalent aerodynamic diameter
POTW	Publicly Owned Treatment Works
POUs	publicly owned utilities

ppb	parts per billion
ppm	parts per million
PPV	peak particle velocity
Program EIR	Program Environmental Impact Report
PRC	Public Resources Code
psi	pounds per square inch
PSM	Process Safety Management
PTFE	Polytetrafluoroethylene
PUC	Public Utilities Commission
PURPA	Public Utility Regulatory Policies Act
PV	Photovoltaic
PVC	Polyvinyl Chloride
PZEV	Partial Zero Emission Vehicles
Qfs	qualifying facilities
RACM	Reasonably Available Control Measures
RACT	Reasonably Available Control Technology
RCRA	Resource Conservation and Recovery Act
RCTC	Riverside County Transportation Commission
RECLAIM	Regional Clean Air Incentives Market
RELOOC	Regional Landfill Options for Orange County
RELs	Reference Exposure Levels
RFS	Renewable Fuel Standard
RHNA	Regional Housing Needs Assessment
RIN	Renewable Identification Number
RMP	Risk Management Program
RMS	Root Mean Squared
ROG	Reactive Organic Gases
RPS	Renewable Portfolio Standard
RQs	Reportable Quantities
RSPA	Research and Special Programs Administration
RTC	RECLAIM Trading Credits
RTIP	Regional Transportation Implementation Plan
RTP	Regional Transportation Plan
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
RUWMP	Regional Urban Water Management Plan
RWQCB	Regional Water Quality Control Board
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SANBAG	San Bernardino Associated Governments
SB	Senate Bill
SBVMWD	San Bernardino Valley Municipal Water District
SBS	sodium bisulfate
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison

SCR	Selective Catalytic Reduction
SCRRA	Southern California Regional Rail Authority
SCS	Sustainable Communities Strategy
SCHR	South Coast Hydrologic Region
SCPPA	Southern California Public Power Authority
SCHWMA	Southern California Hazardous Waste Management Authority
SDG&E	San Diego Gas & Electric
SDCWA	San Diego County Water Authority
SDS	Safety Data Sheet
SEL	Sound Exposure Level
SF_6	Sulfur Hexafluoride
SGVEWP	San Gabriel Valley Energy Wise Program
SIP	State Implementation Plan
SNCR	selective non-catalytic reduction
SO_2	sulfur dioxide
SO_3	Sulfur Trioxide
SoCalGas	Southern California Gas Company
SOF	Solar Occultation Flux
SOON	Surplus Off-Road Option for NOx
SOx	sulfur oxide
SORE	Small Off-Road Equipment
SPCC	Spill Prevention, Control and Countermeasure
SRP	Scientific Review Panel
SRRE	Source Reduction and Recycling Element
SRU	Sulfur Recovery Unit
SSAB	Salton Sea Air Basin
SSM	Startups, Shutdowns, and Malfunctions
STEL	short-term exposure limits
SULEV	super ultra-low emission vehicle
SWFPs	Solid Waste Facility Permits
SWP	State Water Project
SWMD	Solid Waste Management Division
SWIS	Solid Waste Information System
SWMP	Storm Water Management Plan
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	Toxic Air Contaminant
TAF	Thousand Acre-Feet
TAO	Technology Advancement Office
TAZ	transportation analysis zone
TBA	tert-butyl alcohol
T-BAc	tertiary butyl acetate
TCM	Transportation Control Measure
TDM	Transportation Demand Management
TEA-21	Transportation Equity Act for the 21st Century
TEUs	twenty-foot Equivalent Units

TGUs	Tail Gas Units
TIP	Transportation Improvement Program
TiO_2	titanium dioxide
TLVs	Threshold Limit Values
TMDLS	Total Maximum Daily Loads
TOC	Total Organic Carbon
tpd	tons per day
tpy	tons per year
TRI	Toxic Release Inventory
TSCA	Toxic Substances Control Act
TSA	Transportation Security Administration
TSM	Transportation Systems Management
TSS	Total Suspended Solids
TWA	time-weighted average
TXM	Toxic Air Contaminant Control Measure
UARG	Unity Air Regulatory Group
UEL	upper explosive limit
UFC	Uniform Fire Code
Union Pacific	Union Pacific Railroad
Unified Program	Unified Hazardous Waste and Hazardous Materials Management Regulatory Program
UltraCat DGS	catalyst impregnated filters with a Dry Gas Scrubber
U.S.	United States
USBR	United States Bureau of Reclamation
U.S. DOE	United States Department of Energy
U.S. DOT	United States Department of Transportation
U.S. EPA	United States Environmental Protection Agency
U.S.FWS	United States Fish and Wildlife Service
U.S. FS	United States Forest Service
UP	Union Pacific Railroad
USDA	U.S. Department of Agriculture
UST	Underground Storage Tank
UWA	Unified Watershed Assessment
VCTC	Ventura County Transportation Commission
VdB	vibration decibels
VHD	Vehicle Hours of Delay
VHT	Vehicle Hours of Travel
VMT	Vehicle Miles Traveled
VOC	volatile organic compounds
VRM	Vehicle Revenue Miles
V_2O_5	vanadium pentoxide
WDR	Waste Discharge Requirements
WGS	Wet Gas Scrubber
WO_3	tungsten trioxide
WRCOG	Western Riverside Council of Governments
WRD	Water Replenishment District

WRF	Weather Research and Forecasting Model
ZEV	Zero Emissions Vehicles
ug/l	micrograms per liter
ug/m^3	micrograms per cubic meter