July 19, 2016

Honorable Board of Supervisors
County of Imperial

Re: Salton Sea Air Quality Mitigation Program

Honorable Board Members:

The Salton Sea Air Quality Mitigation Program prepared for the Imperial Irrigation District (IID) in coordination with the County of Imperial prepared by Formation Environmental, LLC, Air Sciences Inc. and PlanTierra LLC is now final. The Program provides a comprehensive, science-based, adaptive approach to address air quality mitigation requirements associated with the transfer of up to approximately 300,000 acre-feet per year of conserved water under the Quantification Settlement Agreement. The IID currently implements mitigation requirements associated with the QSA under the corresponding environmental impact report, including air quality mitigation requirements.

The program is summarized in the attached executive summary and will be presented to the board by Brian Schmid of Formation Environmental, LLC, on behalf of IID.

Sincerely,

Ralph Cordova, Jr.
County Executive Officer
Salton Sea Air Quality Mitigation Program

Prepared for:

Imperial Irrigation District
in coordination with the County of Imperial

Prepared by:

Formation Environmental, LLC
Air Sciences Inc.
PlanTierra LLC

JULY 2016
# Table of Contents

List of Abbreviations ...................................................................................................................... v

**Executive Summary** .................................................................................................................. 1

1 **Introduction** .......................................................................................................................... 8

2 **Background and Regulatory Framework** ............................................................................... 8

   2.1 The Quantification Settlement Agreement and The Joint Powers Authority ..................... 8

   2.1.1 The QSA Air Quality Monitoring and Mitigation Requirements ..................................... 9

   2.1.2 The QSA Joint Powers Authority .................................................................................. 11

   2.1.3 Salton Sea Mitigation Water ......................................................................................... 12

   2.1.4 Salton Sea Restoration ............................................................................................... 12

   2.2 The Clean Air Act .............................................................................................................. 13

   2.3 Imperial County Air Pollution Control District .................................................................. 14

   2.3.1 Imperial County PM\(_{10}\) SIP ..................................................................................... 15

   2.3.2 Imperial County Air Pollution Control District Regulation VIII .................................. 16

      2.3.2.1 Rule 800, General Requirements for Control of Fine Particulate Matter ................ 16

      2.3.2.2 Rule 804, Open Areas ....................................................................................... 17

      2.3.2.3 Rule 806, Conservation Management Practices .................................................... 17

   2.4 South Coast Air Quality Management District .................................................................. 18

   2.4.1 Coachella Valley PM\(_{10}\) SIP ..................................................................................... 18

   2.4.2 South Coast Air Quality Management District Regulation IV ..................................... 18

      2.4.2.1 Rule 403, Fugitive Dust .................................................................................... 18

      2.4.2.2 Rule 403.1, Supplemental Fugitive Dust Control Requirements for Coachella Valley Sources ......................................................................................... 19

   2.5 EPA Exceptional Event Rule ............................................................................................. 19

3 **SS AQM Program Description** ............................................................................................. 19

   3.1 PM\(_{10}\) Emissions Inventory ............................................................................................... 20

      3.1.1 Playa Sources ........................................................................................................... 20

         3.1.1.1 Approach ........................................................................................................... 20

         3.1.1.2 Playa Exposure ................................................................................................ 21

            3.1.1.2.1 Projected Future Exposure ........................................................................... 21

            3.1.1.2.2 Actual Playa Exposure .............................................................................. 21

            3.1.1.2.3 Exposed Playa Land Ownership ................................................................. 28

         3.1.1.3 Surface Characteristics ....................................................................................... 28

            3.1.1.3.1 Existing Playa ............................................................................................ 28

            3.1.1.3.2 Future Playa ............................................................................................ 31
3.1.1.4 Assessing the Emission Potential of Exposed Playa Surfaces .................................................. 32
  3.1.1.4.1 Purpose .......................................................................................................................... 32
  3.1.1.4.2 Field Measurement System ...................................................................................... 32
  3.1.1.4.3 PI-SWERL Operation on Salton Sea Playa .............................................................. 34

3.1.1.5 Delineating Active Areas on Exposed Playa ................................................................. 35

3.1.1.6 Estimating Emissions on Active Areas ........................................................................... 35
  3.1.1.6.1 Maximum Daily Emissions ...................................................................................... 35
  3.1.1.6.2 Total Annual Emissions .......................................................................................... 36
  3.1.1.7 Modeling Impacts at Monitoring Stations ................................................................. 36

3.1.2 Non-Playa Sources ........................................................................................................... 36
  3.1.2.1 Approach .................................................................................................................... 36
  3.1.2.2 Area of Interest .......................................................................................................... 36
  3.1.2.3 Surface Types ........................................................................................................... 38
  3.1.2.4 Off-Sea / Open Area Land Ownership ................................................................. 40
  3.1.2.5 Monitoring Components .......................................................................................... 41
    3.1.2.5.1 Ambient PM_{10} Concentrations ................................................................. 41
    3.1.2.5.2 Meteorology ....................................................................................................... 43
    3.1.2.5.3 Sand Motion ........................................................................................................ 43
    3.1.2.5.4 PI-SWERL Sampling ......................................................................................... 44
    3.1.2.5.5 Video Monitoring ............................................................................................... 44
  3.1.2.6 Estimating Emission Rates .................................................................................... 44
    3.1.2.6.1 Maximum Daily Emissions ............................................................................... 44
    3.1.2.6.2 Total Annual Emissions ..................................................................................... 44

3.1.3 Updates to the Emission Inventories ........................................................................... 44

3.2 Dust Control Strategy ........................................................................................................ 45
  3.2.1 Conceptual Proactive Dust Control Strategy .............................................................. 45
    3.2.1.1 Pilot-Testing for New Dust Control Measures ...................................................... 46
    3.2.1.2 Annual Proactive Dust Control Planning and Implementation .......................... 46
  3.2.2 ICAPCD Regulation VIII Rules for the Salton Sea Playa ........................................ 47
  3.2.3 Playa Traffic Management ...................................................................................... 48

3.3 Estimated Program Costs .................................................................................................. 50
  3.3.1 Cost Assumptions ........................................................................................................ 50
    3.3.1.1 Rate of Playa Exposure ......................................................................................... 50
    3.3.1.2 Emissive Characteristics of the Playa ................................................................. 51
    3.3.1.3 DCMs Approved as BACM .................................................................................. 51
3.3.1.4 DCM Unit Cost .......................................................................................................................... 54
3.3.2 Estimated Program Costs .................................................................................................................. 55

4 Agency Communication, Coordination and Reporting........................................................................... 57
4.1 Agency Communication and Coordination .......................................................................................... 57
4.2 Summary of Reporting .......................................................................................................................... 57

5 References ............................................................................................................................................ 58

Tables

Table 3-1. USGS Gauge Exposure Estimates ............................................................................................. 22
Table 3-2. Landsat MNDWI and USGS Gauge Playa Exposure Estimates ...................................................... 26
Table 3-3. Surface Properties Collected During Surface Characterization Events ...................................... 31
Table 3-4. Off-Sea Surface Classification Legend ....................................................................................... 39
Table 3-5. Salton Sea Aerometric Monitoring Instruments ........................................................................ 43
Table 3-6. Playa Traffic Management Plan – Program Items and Approach ................................................. 50
Table 3-7 Playa Exposed for Each Construction Phase (rounded to the nearest thousand) ...................... 52
Table 3-8 Assumed DCM Implementation Percentages for Approved BACM Under ICAPCD Rule 804 and All DCMs Identified in This Program ......................................................................................... 53
Table 3-9 Estimated Dust Control Measure Unit Capital and O&M Costs (2014$) ........................................ 54
Table 3-10 Capital cost estimates for conveyance infrastructure as presented in the PEIR for air quality management ............................................................................................................................... 55
Table 3-11 Summary of Dust Control Total Costs (2014$) ........................................................................ 56

Figures

Figure ES-1. SS AQM Program Components and Workflow ......................................................................... 7
Figure 3-1. USGS Gauge Location and Shoreline Extraction Process for June 2015 ........................................ 23
Figure 3-2. Landsat MNDWI Playa Exposure Estimate .................................................................................. 25
Figure 3-3. Landsat MNDWI vs. USGS Gauge Playa Exposure .................................................................... 26
Figure 3-4. LANDSAT MNDWI and USGS Gauge Exposure for 2008 ........................................................ 27
Figure 3-5. Example Playa Surface Classification Map ................................................................................ 30
Figure 3-6. Soil Characteristics of Future Exposed Playa from Acoustic Sonar Data ........................................ 33
Figure 3-7. Portable In-Situ Wind Erosion Laboratory (PI-SWERL) ............................................................ 34
Figure 3-8. Off-Sea Source Inventory Area Of Interest (AOI) ...................................................................... 37
Figure 3-9. (A) Sand-Dominated Dry Wash with Heavy OHV Traffic and (B) Gravel- and Sand-Dominated Alluvial Fan ......................................................................................................................... 39
Figure 3-10. (A) Large Sand Sheet and (B) The Algodones Dune Field ........................................................... 40
Figure 3-11. (A) Cobbles Distributed Over Silt-Dominated Paleo Lakebed and (B) Silt-Dominated Paleo Lakebed... 41
Figure 3-12. (A) Sandstone Bedrock and (B) Offshore Playa .................................................................40
Figure 3-13. Salton Sea PM10 Monitoring Locations ...........................................................................41
Figure 3-14. Example Set of PM10 Roses for Salton Sea, 2014 .................................................................43
Figure 3-15. Photo of Salt Crust Pulverized by Off-Highway Vehicle Traffic .......................................49

Appendices

Appendix A – Master Response on Salton Sea Air Quality Monitoring and Mitigation Plan in Final EIR/EIS
Appendix B – Exposed Playa PM10 Inventory
Appendix C – Off-Sea PM10 Inventory
Appendix D – Standard Operating Procedures
Appendix E – Dust Conrol Measure Descriptions
# List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>AOI</td>
<td>Area of Interest</td>
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<tr>
<td>BACM</td>
<td>Best Available Control Measure</td>
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<tr>
<td>BLM</td>
<td>Bureau of Land Management</td>
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<tr>
<td>CAA</td>
<td>Clean Air Act</td>
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<tr>
<td>CARB</td>
<td>California Air Resources Board</td>
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<tr>
<td>CFR</td>
<td>Code of Federal Regulations</td>
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<tr>
<td>CMP</td>
<td>Conservation Management Practice</td>
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<tr>
<td>CSC</td>
<td>Cox Sand Catcher</td>
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<td>CVWD</td>
<td>Coachella Valley Water District</td>
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<tr>
<td>EIR</td>
<td>Environmental Impact Report</td>
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<tr>
<td>EIS</td>
<td>Environmental Impact Statement</td>
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<tr>
<td>EPA</td>
<td>Environmental Protection Agency</td>
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<tr>
<td>ICAPCD</td>
<td>Imperial County Air Pollution Control District</td>
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<td>IID</td>
<td>Imperial Irrigation District</td>
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<tr>
<td>IIDSS</td>
<td>Imperial Irrigation District Support System</td>
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<tr>
<td>KGRA</td>
<td>Known Geothermal Resource Area</td>
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<tr>
<td>LiDAR</td>
<td>Light Detection and Ranging</td>
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<tr>
<td>MNDWI</td>
<td>Modified Normalized Difference Water Index</td>
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<tr>
<td>MPH</td>
<td>Miles Per Hour</td>
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<tr>
<td>MWD</td>
<td>Metropolitan Water District of Southern California</td>
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<tr>
<td>NAAQS</td>
<td>National Ambient Air Quality Standards</td>
</tr>
<tr>
<td>NASA</td>
<td>National Aeronautics and Space Administration</td>
</tr>
<tr>
<td>NTS</td>
<td>Naval Test Station</td>
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<tr>
<td>OHV</td>
<td>Off-Highway Vehicles</td>
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<tr>
<td>PEIR</td>
<td>Programmatic Environmental Impact Report</td>
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<tr>
<td>PI-SWERL</td>
<td>Portable In-Situ Wind Erosion Laboratory</td>
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<tr>
<td>PM</td>
<td>Particulate Matter</td>
</tr>
<tr>
<td>PM$_{10}$</td>
<td>Particulate Matter less than 10 Microns in Aerodynamic Diameter</td>
</tr>
<tr>
<td>PM$_{2.5}$</td>
<td>Particulate Matter less than 2.5 Microns in Aerodynamic Diameter</td>
</tr>
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<td>PVID</td>
<td>Palo Verde Irrigation District</td>
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<tr>
<td>QSA</td>
<td>Quantification Settlement Agreement</td>
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<tr>
<td>RACM</td>
<td>Reasonable Available Control Measures</td>
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<td>SC</td>
<td>Salton City</td>
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<td>SCAQMD</td>
<td>South Coast Air Quality Management District</td>
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<tr>
<td>SDCWA</td>
<td>San Diego County Water Authority</td>
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<tr>
<td>Abbreviation</td>
<td>Description</td>
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<td>--------------</td>
<td>--------------------------------------------------</td>
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<tr>
<td>SIP</td>
<td>State Implementation Plan</td>
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<td>SPI</td>
<td>Sediment Profile Imaging</td>
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<td>SSAM</td>
<td>Salton Sea Accounting Model</td>
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<td>SS AQM Program</td>
<td>Salton Sea Air Quality Mitigation Program</td>
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<tr>
<td>SVRA</td>
<td>State Vehicular Recreation Area</td>
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<tr>
<td>SWIR</td>
<td>Short-Wave Infrared</td>
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<tr>
<td>SWRCB</td>
<td>State Water Resources Control Board</td>
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<tr>
<td>TEOC</td>
<td>Tapered Element Oscillating Microbalance</td>
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<tr>
<td>TIG</td>
<td>Terrestrial Image Georeferencing</td>
</tr>
<tr>
<td>tpd</td>
<td>Tons Per Day</td>
</tr>
<tr>
<td>tpy</td>
<td>Tons Per Year</td>
</tr>
<tr>
<td>UAV</td>
<td>Unmanned Airborne Vehicle</td>
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<tr>
<td>USGS</td>
<td>United States Geological Survey</td>
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<tr>
<td>VDE</td>
<td>Visible Dust Emissions</td>
</tr>
<tr>
<td>μg/m³</td>
<td>Micrograms Per Cubic Meter</td>
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EXECUTIVE SUMMARY

This Salton Sea Air Quality Mitigation Program (SS AQM Program) was prepared by Imperial Irrigation District (IID) to provide a comprehensive, science-based, adaptive approach to address air quality mitigation requirements associated with the transfer of up to approximately 300,000 acre-feet per year of conserved water under the Quantification Settlement Agreement (QSA). The conserved water transfer reduces the volume of agricultural return flow to the Salton Sea, thereby exposing the playa and increasing the potential for dust emissions that could affect communities near and around the Sea. The required air quality mitigation measures to address these potential dust emissions are generally defined as: 1) restricting access to the exposed playa, 2) researching and monitoring the exposed playa, 3) creating or purchasing offsetting emission reduction credits and 4) implementing direct emission reduction measures on the exposed playa. This SS AQM Program expands upon these general mitigation measures with detailed methods to assess playa dust emissions and identify options to mitigate them. This SS AQM Program also provides support and options for land management decisions associated with the playa as the Salton Sea recedes.

Dust emissions, or PM\textsubscript{2.5} and PM\textsubscript{10}, are hazardous to human health. Imperial County is currently designated as a serious nonattainment area for PM\textsubscript{10} due, in part, to windblown dust. Future exposed playa is anticipated to be a new source of dust emissions; however, until it is exposed, the location, frequency and magnitude of future emissions are unknown. The objective of this SS AQM Program is to proactively detect, locate, assess and identify options to mitigate dust emissions from exposed Salton Sea playa. This program includes steps to characterize the actual emission potential of exposed playa as the Salton Sea recedes and options to proactively prevent the occurrence of significant dust emissions. This program also includes steps to understand dust emissions from desert areas adjacent to the Salton Sea, which is critical for distinguishing playa dust emissions from off-Sea sources and for understanding the potential impact of off-Sea sources on exposed playa.

A large portion of the Salton Sea is located in Imperial County, within the jurisdiction of the Imperial County Air Pollution Control District (ICAPCD). A smaller portion of the Salton Sea is in Riverside County, within the jurisdiction of the South Coast Air Quality Management District (SCAQMD). IID anticipates that some or all of the information from this SS AQM Program will be considered in future revisions to the Imperial County PM\textsubscript{10} State Implementation Plan (SIP). The Imperial County PM\textsubscript{10} SIP is the regulatory document that guides dust control efforts within Imperial County. This SS AQM Program was developed in coordination with the County of Imperial to be consistent with and provide additional technical and scientific information to inform the ICAPCD SIP revision process.

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1 Impact AQ-7 is identified in the Final Imperial Irrigation District Water Conservation and Transfer Project, Draft Habitat Conservation Plan Environmental Impact Report/Environmental Impact Statement, SCH #99091142 (Final EIR/EIS), and the associated mitigation requirements are found in the Imperial Irrigation District Water Conservation and Transfer Project Mitigation, Monitoring and Reporting Program, dated September 2003 (MMRP).

2 Mitigation Measure AQ-7 of the MMRP.

3 Particulate matter less than 2.5 and 10 microns in diameter.
This executive summary provides the key questions to be answered by this SS AQM Program. It summarizes each component of the program and provides a flow chart of program implementation (Figure ES-1).

**Air Quality Regulatory Framework**

- **What air quality regulations influence this SS AQM Program?**

  *The Clean Air Act (CAA) and State Implementation Plans (SIP).* The CAA is a United States federal law designed to control air pollution at the national level. It requires the Environmental Protection Agency (EPA) to develop and enforce regulations to protect the public from airborne contaminants known to be hazardous to human health. Under the CAA, states are required to submit a SIP describing how air basins designated as nonattainment areas will be brought into compliance with federal and state ambient air quality standards. The SIP contains the plan for attaining the standards as soon as possible, but in no more than five years, based on the severity of the air pollution and the difficulty posed by obtaining cleaner air. The ICAPCD is the designated agency for developing and implementing the SIP for Imperial County, as is SCAQMD for Riverside County.

  *Imperial County Air Pollution Control District Rules and Regulations.* ICAPCD regulates fugitive dust emissions in Imperial County through its PM$_{10}$ SIP and Regulation VIII rules. The Regulation VIII rules are based, in part, on an emissions inventory of fugitive dust sources (e.g., construction activities, agricultural operations, disturbed open areas). Rules are developed for each source category and identify the dust control measures (Best Available Control Measures or BACM) to reduce emissions. The type and intensity of dust control measures (e.g., apply water, establish vegetation, apply gravel or chemical stabilizers/suppressants) required to reduce emissions vary for each fugitive dust source.

  Regulation VIII is divided into seven rules. Three of the rules—800, 804 and 806—are relevant to this SS AQM Program. Rule 800 contains the definitions, exemptions, general requirements, administrative requirements and test methods that are applicable to all Regulation VIII rules. Rule 804 applies to open areas that contain disturbed surface area. The Salton Sea is currently categorized as an “open area” and ICAPCD can order implementation of dust control on the Salton Sea playa based on the current Rule 804. Rule 806 applies to agricultural operation sites and pertains to this SS AQM Program because some future exposed Salton Sea playa could be reclaimed for agricultural use.

  *South Coast Air Quality Management District Rules and Regulations.* SCAQMD regulates fugitive dust emissions in Riverside County and specifically within the Coachella Valley. Fugitive dust emissions are regulated through the Coachella Valley PM$_{10}$ SIP and Regulation IV rules. Regulation IV is divided into several rules and rules 403 and 403.1 are relevant to this SS AQM Program. Rule 403 applies to any activity or man-made condition capable of generating fugitive dust. Rule 403.1 is a supplemental rule and it applies specifically to fugitive dust sources in the Coachella Valley. The dust control measures identified in the rules are similar to those identified in the ICAPCD rules.
Emissions Inventory and Monitoring Program

- **When and where will exposed playa occur?** The timing and location of future playa exposure is a function of the Salton Sea floor elevation and the Sea’s response to inflows, salt loads and evaporation rates. A hydrologic model will be used to simulate projected playa exposure. These simulations will provide planning-level information about the timing and location of anticipated playa exposure. In addition, actual playa exposure will be mapped to provide a real time understanding of playa exposure and to validate the hydrologic model results. Playa exposure will be mapped using Landsat satellite imagery and a combination of United States Geological Survey gauge elevation data and high-resolution bathymetric data (collected in 2005). Results will be used to track actual playa exposure as it occurs, guide monitoring of exposed playa surfaces and adjust assumptions related to future hydrologic model projections.

- **How will the surface characteristics of the playa be determined?** The surface characteristics of exposed playa will be variable and must be reliably mapped because they are directly related to emission potential. Extensive survey methods originally developed for Owens Lake are being adapted for use at the Salton Sea. This includes monitoring protocols to accurately map existing playa surface characteristics (analogous to soil map units) using remotely sensed data resources and ground-based surface evaluations. Ground-based surface evaluations include detailed characterization of surface properties related to erosion (e.g., crust type, crust thickness, soil moisture). These datasets will then be used as calibration data to spatially map playa surface types, vegetation and other surface characteristics using LiDAR (Light Detection and Ranging), UAV (unmanned aerial vehicle) imagery and other sources of satellite-based imagery. These mapping efforts will be done periodically to provide an updated inventory of exposed playa surface units and associated physical characteristics.

- **How will the emission potential of different playa surface types be assessed?** The vulnerability of different playa surfaces to erosion is known to be highly variable. This SS AQM Program will assess which playa surfaces and conditions are actually emissive and establish PM$_{10}$ emission rates for different types of surfaces. Emission potential will be assessed using a device called a Portable In-Situ Wind Erosion Laboratory (PI-SWERL). After placement on the ground surface, the PI-SWERL simulates varying wind speeds and measures the number and size of suspended particles within the device, thus providing an estimate of emission potential under a range of simulated wind conditions. PI-SWERL sampling will occur monthly on each identified playa surface type. Monthly results will facilitate a better understanding of the “dust season” on different parts of the playa. The dust season refers to times of the year when dust emissions typically occur under different climate and soil conditions.

- **How will actively emissive playa dust source areas be identified?** Active dust source areas must be quickly and reliably mapped so that dust control needs can be identified, prioritized and implemented. Active dust source areas will be mapped based on photographic, video and/or visual observations of dust plumes and the presence of erosion and depositional surface features. A high-resolution satellite or UAV image will be collected after each wind event where dust plumes are observed. The imagery will provide a photo-interpretive base for delineating source areas and
focusing field investigations. Photographic evidence will also be collected for each delineated source area and linked to a GPS (global positioning system) location. Emission rates for each source area will be developed using the PI-SWERL.

- **How will dust emissions from desert areas around the Salton Sea be assessed?** Dust emissions and dust source areas from open areas adjacent to the Salton Sea affect this SS AQM Program in two ways: 1) dust emissions from the surrounding desert sources will mix with emissions from newly exposed playa, making it difficult to distinguish playa dust emissions from the surrounding off-Sea dust emissions and 2) sand intrusion from active alluvial fans and from dune migration toward the playa will increase the emissions potential of exposed playa due to the associated surface disturbance and erosion.

This SS AQM Program will assess dust emissions from areas adjacent to the Salton Sea to establish the location, timing and magnitude of off-Sea emissions. The approach includes: (1) using data from the existing PM$_{10}$ monitoring network to show the frequency, magnitude and direction of PM$_{10}$ concentrations in the desert areas west of the Salton Sea; (2) a network of fixed sand motion monitoring instruments placed within various surface types; (3) video monitoring to provide visual evidence of dust emissions; and (4) PI-SWERL sampling to characterize the emission potential of various surface types (e.g., dry washes, alluvial fans, sand sheets, dunes). This information will be used to confirm the location and timing of off-Sea emissions and to support an updated PM$_{10}$ emission inventory for the open area source category in the Imperial County PM$_{10}$ SIP.

- **How will playa emissions data be evaluated and reported?** As playa is exposed, the surface characteristics and emission potential will be rigorously evaluated to provide multiple lines of evidence related to playa emissions, as described in the preceding sections. These data will be used to estimate emissions from high wind events and to quantify the tons of PM$_{10}$ generated from each source area on the playa for each specific wind event. Maximum daily (tons per day) and total annual emissions (tons per year) will also be estimated. In addition, the California Puff (CALPUFF) modeling system will be used to model the impacts of the maximum daily emissions from exposed playa sources at monitoring stations located around Imperial and Riverside Counties. Initially, results from these evaluations will be used to establish criteria to prioritize dust source areas that have high emission potential. Once criteria are established, source areas with high emission potential will be prioritized for proactive dust control measures. Depending on the prioritization, proactive dust control measures may be implemented as soon as practicable or incorporated into the Annual Proactive Dust Control Plan for the following year (described in the following sections). Playa emissions will be summarized and reported in an annual Playa Inventory and Monitoring Report.

**Dust Control Strategy / Planning and Implementation**

- **What dust control measures are allowed by the ICAPCD Regulation VIII rules?** The Salton Sea is currently categorized as an “open area” under ICAPCD rules. Under Rule 804, if visible dust emissions (VDE) in open areas exceed 20 percent opacity or if stabilized surface conditions are not met (pursuant to Rule 800 specifications), then Best Available Control Measures (BACM) must be implemented. BACM for open areas include: (1) applying water or chemical dust suppressants to all
un-vegetated areas, (2) establishing 50% vegetative cover on previously disturbed areas, (3) paving, applying and maintaining gravel or applying and maintaining chemical dust suppressants and (4) alternative BACM as approved by the ICAPCD. After implementation of BACM, monitoring is required to determine whether the stabilized surface criteria have been achieved.

IID and ICAPCD recognize the need for playa-specific surface stability definitions and emissions measurement methods, alternatives to VDE, alternative BACM and modified performance criteria. As this SS AQM Program is implemented, results will help guide the development of these playa-specific parameters.

- **How will decisions regarding implementation of dust control measures on exposed playa be made?** The overarching goal of this SS AQM Program is to identify the tools that can be used to prevent exposed Salton Sea playa from becoming a significant source of PM$_{10}$ emissions based upon the best available science. A large part of implementing an effective dust control strategy is to identify and implement those dust control measures (DCMs) on emissive playa surfaces before they reach thresholds that prompt regulatory orders for dust control. This approach provides increased flexibility for implementing effective dust control measures in the most cost effective manner and for facilitating immediate dust control actions at the Salton Sea. The proactive dust control strategy will include broad-scale implementation of DCMs that are protective of air quality, but also adaptable given the variables regarding temporal exposure and the magnitude of future emissions.

On an annual basis and as playa is exposed each year, the surface characteristics and emission potential will be rigorously evaluated (i.e., Emissions Inventory and Monitoring Program). Initially, results from these evaluations will be used to establish criteria to identify areas of exposed playa that have high emission potential and prioritize dust control needs and measures. Criteria will be developed for each playa evaluation method (e.g., surface survey, PI-SWERL data, video monitoring), such that any individual line of evidence could be used to identify areas for proactive control. Once the criteria are established, IID will use the monitoring results to develop an Annual Proactive Dust Control Plan. The Annual Proactive Dust Control Plan will inform and take into account current and future land management and land use planning efforts, including those associated with Salton Sea restoration efforts by the State and other activities and projects planned by agencies and/or individuals for specific areas of the playa.

After each Annual Proactive Dust Control Plan is reviewed and approved, if necessary, by the IID board, DCMs may be implemented in accordance with that plan. Yearly results from the Emissions Inventory and Monitoring Program will be used to prioritize DCM implementation on an on-going basis. As DCMs are implemented, they will be monitored to confirm that adequate surface stabilization is maintained. If the initial proactive DCM does not maintain a stabilized surface, the DCM will be further enhanced. This approach allows resources to be allocated efficiently and effectively, and in an expeditious manner to prevent significant sources of PM$_{10}$. The dust control strategy also includes development and testing of new DCMs and a playa traffic management plan as described below.

- **How will DCMs be selected for the unique conditions at the Salton Sea?** The dust control strategy includes the development and testing of new DCMs that are specifically tailored to the climate and
soil conditions on and around the playa and that make efficient use of available resources. Some DCMs have been field-tested and proven to be effective and some DCMs need additional research prior to use at the Salton Sea. For those DCMs needing additional research, pilot field testing (pilot projects) may be pursued. Pilot projects allow IID to gain experience and understanding of locally-adapted methods of dust control and the site-specific factors that could affect their feasibility and cost. Pilot projects also are useful for determining the effectiveness of dust control and refining design criteria for full-scale implementation. This helps develop efficient and effective approaches for the design, construction and operation of DCMs on the playa.

- **How will off-highway vehicle (OHV) traffic be managed?** The dust control strategy includes development and implementation of a playa traffic management plan focused on public outreach and education. Extensive desert areas around the Salton Sea attract recreationalists and OHV traffic. Due to proximity, it is highly likely that OHV use would expand onto the playa as the Salton Sea recedes. This activity will disturb the natural stability of playa crust and soil surfaces and increase erodibility and PM10 emissions, as well as disturb DCMs being implemented on the playa. Prevention of vehicle-related disturbances is the most important and cost-effective measure available to prevent and control dust emissions.

- **How will information related to this SS AQM Program be shared with others?** This SS AQM Program is focused on monitoring and mitigating dust emissions from exposed Salton Sea playa. There are numerous agencies and landowners involved in activities at the Salton Sea from an air quality and habitat perspective. Communication and coordination among these agencies is essential to the success of this SS AQM Program. IID will coordinate implementation of this SS AQM Program with these agencies and provide an annual progress report.
FIGURE ES-1. SS AQM PROGRAM COMPONENTS AND WORKFLOW. Each component of this SS AQM Program is used to identify, prioritize and guide implementation of dust control measures on exposed Salton Sea Playa. This flowchart identifies important program components and how they are used to guide dust control implementation.

IID Salton Sea Air Quality Mitigation Program

Annual Emissions Inventory and Monitoring Program
- Map Projected and Actual Playa Area
- Monitor Playa Surface Characteristics and Map Soil Properties
- Measure Airborne Dust Emissions
- Map Playa Dust Source Areas and Document Dust Flumes
- Estimate High Wind Dust Emissions from Playa Dust Source Areas

Dust Control Strategy / Planning
- Develop and Test Dust Control Measures Tailored to the Climate and Soil Conditions at the Salton Sea
- Select Alternative Best Management Practices (BMPs) and SCRM

Dust Control Implementation
- Potential Locations for Hector Dust Control
- Select BMPs

Air Quality Regulatory Framework
- Federal Clean Air Act
- Imperial County (ECAPD) and Coachella Valley (CA:SMO) Form Implementation Plans (IPs)
- Potential Future Action for Dust Control

Other Salton Sea Air Quality Mitigation Program Components
- Field Tests / Monitoring
- Off-Sea Emissions Inventory
- Stakeholder and Public Outreach
- Potential Dust Valley Emission Reduction Efforts
- Other Strategic Salton Sea AQ Program

SS AQM Mitigation Program studies and results are used collaboratively with ECAPD, SCRM, CA:SMO, and EPA to inform revision of the Imperial County PM10, SF and Regulated Volatile, Coachella Valley PM10, SF and Regulation in Rules.
1 INTRODUCTION

This document sets out the general parameters of the Salton Sea Air Quality Mitigation Program (SS AQM Program) prepared for the Imperial Irrigation District (IID). As explained in more detail below, this SS AQM Program expands on the air quality monitoring and mitigation requirements resulting from the conserved water transfers under the Quantification Settlement Agreement (QSA). The objective of this SS AQM Program is to proactively detect, locate, assess and identify options to mitigate dust emissions from exposed Salton Sea playa. This SS AQM Program also provides scientific support and options for land management decisions associated with the playa as the Salton Sea recedes.

This SS AQM Program provides a comprehensive, science-based, adaptive approach to address air quality mitigation requirements to assist in the decision-making process for implementation of air quality mitigation. This program has a limited focus and does not expand into other areas that may provide air quality mitigation as a secondary benefit, but serves other primary purposes, such as habitat creation and restoration or renewable energy development. Further, this program is not intended to provide a restoration plan for the Salton Sea or to make predetermined decisions regarding the implementation of air quality mitigation. This SS AQM Program provides for an annual on-going process to detect, locate, assess and identify options to mitigate dust emissions from exposed Salton Sea playa, which ultimately provides the scientific support to the IID to make decisions regarding the implementation of specific mitigation measures. Several outside factors will contribute to the decision-making process and this program is intended to work with and in light of those factors, including in coordination with any other Salton Sea restoration and mitigation activities taken by other agencies and/or stakeholders. The technical details supporting this document are included in the appendices.

2 BACKGROUND AND REGULATORY FRAMEWORK

This section describes the background and regulatory framework for this SS AQM Program, including the conserved water transfers under the QSA that are expected to accelerate Salton Sea playa exposure beginning in 2017 and the air quality monitoring and mitigation requirements under the QSA. The regulatory framework is discussed next, including the Clean Air Act (CAA) and its requirements for submitting a State Implementation Plan (SIP) for nonattainment areas, the Imperial County PM$_{10}$ SIP, the Coachella Valley PM$_{10}$ SIP, various Imperial County Air Pollution Control District (ICAPCD) and South Coast Air Quality Management District (SCAQMD) rules that guide future dust control efforts on the Salton Sea playa, and the Environmental Protection Agency (EPA) Exceptional Event Rule.

2.1 THE QUANTIFICATION SETTLEMENT AGREEMENT AND THE JOINT POWERS AUTHORITY

The QSA is a series of agreements that provide for a long-term conserved water transfer of up to 303,000 acre-feet annually from IID to the San Diego County Water Authority (SDCWA) and the
Coachella Valley Water District (CVWD). These conserved water transfers under the QSA allow California to limit its demand on Colorado River water to its annual 4.4 million acre-feet entitlement and ensures water supply reliability throughout Southern California.

The QSA caps IID’s annual consumptive water use to 3.1 million acre-feet and provides for the transfer of conserved water outside of Imperial County. IID conserves the water for transfer through various conservation programs. The transfer of the conserved water means less water is applied to the farm land within the Imperial County, which in turn means reduced agricultural return flows into the Salton Sea causing the Sea elevation to recede over time.

2.1.1 THE QSA AIR QUALITY MONITORING AND MITIGATION REQUIREMENTS

Pursuant to the California Environmental Quality Act (CEQA), California Public Resources Code sections 21000 et seq., the environmental impacts of the conserved water transfers under the QSA were analyzed in an environmental impact report and then monitoring and mitigation measures were included in a Mitigation, Monitoring and Reporting Program (MMRP) to ensure that identified impacts are monitored and mitigated for the life of the QSA. The Final EIR/EIS identified potential air quality impacts from windblown dust from exposed Salton Sea playa as a result of the conservation of up to approximately 300,000 acre-feet reducing the volume of agricultural inflows to the Sea. The requirements for monitoring and mitigating dust emissions from the exposed Salton Sea playa are identified in the Final EIR/EIS and as Mitigation Measure AQ-7 in the MMRP. The specific section of the Final EIR/EIS is provided in Appendix A of this SS AQM Program for reference. The Salton Sea air quality monitoring and mitigation requirements, in pertinent part, are as follows:

1. **Restrict Access:** Public access, especially off-highway vehicle access, would be limited, to the extent legally and practicably feasible, to minimize disturbance of natural crusts and soils surfaces in future exposed shoreline areas.
2. **Research and Monitoring:** A research and monitoring program would be implemented incrementally as the Sea recedes. The research phase would focus on development of information to help define the potential for problems to occur in the future as the Sea elevation is reduced slowly over time. Research would:
   a. Study historical information on dust emissions from exposed shoreline areas.
   b. Determine how much land would be exposed over time and who owns it.

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4 Or the Metropolitan Water District of Southern California in place of CVWD under certain circumstances. For more details see the Quantification Settlement Agreement By and Among Imperial Irrigation District, The Metropolitan Water District of Southern California and the Coachella Valley Water District and the Agreement for Acquisition of Water Between Coachella Valley Water District and the Metropolitan Water District of Southern California, both dated October 10, 2003.
5 Final Imperial Irrigation District Water Conservation and Transfer Project, Draft Habitat Conservation Plan Environmental Impact Report/Environmental Impact Statement, SCH #99091142 (Final EIR/EIS)
6 Mitigation, Monitoring and Reporting Program for the IID Water Conservation and Transfer Project EIR/EIS, dated June 2008 (MMRP).
7 Section 3.16.2, pages 3-70 to 3-71.
8 Section 3.9.5, pages 3-50 to 3-52.
9 Impact AQ-7, Table 1, pages 21-22.
c. Conduct sampling to determine the composition of “representative” shoreline sediments and the concentrations of ions and minerals in salt mixtures at the Sea.

d. Analyze [data] to predict responses of Salton Sea salt crusts and sediments to environmental conditions, such as rainfall, humidity, temperature and wind.

e. Implement a meteorological, PM_{10} and toxic air contaminant monitoring program to begin under existing conditions and continue as the [Sea recedes]. The goal of the monitoring program would be to observe PM_{10} problems or incremental increases in toxic air contaminant concentrations associated with [receding Sea levels] and to provide a basis for mitigation efforts.

f. If incremental increases in toxic air contaminants (such as arsenic or selenium, for example) are observed at the receptors and linked to emissions from exposed shoreline caused by [receding Sea levels], conduct a health risk assessment to determine whether the increases exceed acceptable thresholds established by the governing air districts and represent a significant impact.

g. If potential PM_{10} or health effects problem areas are identified through research and monitoring and the conditions leading to PM_{10} emissions are defined, study potential dust control measures specific to the identified problems and the conditions at the Salton Sea.

3. **Create or Purchase Offset Emission Reduction Credits**: This step would require negotiations with the local air pollution control districts to develop a long-term program for creating or purchasing offsetting PM_{10} emission reduction credits.\(^\text{10}\)

4. **Direct Emission Reductions at the Sea**: If sufficient offsetting emission reduction credits are not available or feasible, Step 4 of this mitigation plan would be implemented. It would include either, or a combination of:

   a. Implementing feasible dust mitigation measures; and/or
   
   b. If feasible, supplying water to the Sea to re-wet emissive areas exposed by the [receding Sea].

In addition to the Final EIR/EIS Salton Sea air quality monitoring and mitigation requirements, the QSA is subject to compliance with the terms and conditions of several state and federal permits and approvals. This includes the California State Water Resources Control Board (SWRCB) Revised Order WRO 2002-0013 approving the water transfers (SWRCB Order). This SWRCB Order incorporated the Final EIR/EIS air quality mitigation measures. The SWRCB Order additionally requires IID to evaluate dust control measures to determine their feasibility and delegates to the Water Rights Division Chief the authority to determine, in consultation with the ICAPCD, SCAQMD and the California Air Resources Board (CARB), whether any dust mitigation measures identified are feasible.

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\(^{10}\) Note: ICAPCD and SCAQMD do not currently support programs for creating or purchasing PM_{10} emission reduction credits. Therefore, this SS AQM Program does not address PM_{10} emission reduction credits. However, this SS AQM Program does not preclude future negotiations with local regulatory agencies to investigate the development of a long-term program for creating or purchasing offsetting PM_{10} emission reduction credits.
This SS AQM Program does not alter or replace any of these Salton Sea air quality monitoring and mitigation requirements. Rather, it expands on and provides greater detail of these monitoring and mitigation requirements. The Salton Sea playa that is exposed as a direct result of the water transfers under the QSA is subject to the air quality monitoring and mitigation requirements described above under the Final EIR/EIS and the SWRCB Order, in addition to all other federal, state and local laws, rules and regulations pertaining to air quality.

2.1.2 The QSA Joint Powers Authority

Under the QSA and supporting legislation, the State of California has assumed financial responsibility for QSA-related mitigation, with the exception of the first $133 million (in 2003 dollars) in QSA mitigation costs paid by CVWD, SDCWA and IID. The Quantification Settlement Agreement Joint Powers Authority Creation and Funding Agreement was entered into by the State of California, CVWD, SDCWA and IID in October 2003. In that agreement, the Quantification Settlement Agreement Joint Powers Authority (QSA JPA) was created to pay for environmental mitigation requirements and costs “by and through the collection, holding, investing and disbursing of funds.” The funds managed by the QSA JPA are from the water agencies for the first $133 million (in 2003 dollars) and then from the State of California for environmental mitigation costs in excess of that limit.

The QSA JPA must adopt an annual budget for the payment of environmental mitigation costs. As IID, or any other party implementing mitigation, incurs direct costs for environmental mitigation activities under the approved budget, IID, or that other party, is reimbursed by the QSA JPA for those costs. The QSA JPA is allowed, but not required, to “adopt a long-term financing plan to assure that sufficient funds are available to meet the reasonably expected annual costs” for environmental mitigation.

Concurrent with the QSA, IID prepared a draft Habitat Conservation Plan (HCP) to cover permitting under the Endangered Species Act (ESA) for activities done under the QSA including conservation programs and mitigation measures. The HCP was prepared in coordination with the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Wildlife (CDFW) and provides specific biological conservation measures for implementation of the QSA, which were included in the MMRF for the QSA. Mitigation measures associated with the HCP are managed by an Implementation Team (IT), which is set forth in the HCP and corresponding mitigation measures. The IT is not directly responsible for managing air quality mitigation, except to the extent that implementation of any air quality mitigation might have an impact on the species covered in the HCP or other wildlife.

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11 For a detailed discussion regarding California’s Salton Sea restoration and QSA mitigation obligations under the QSA and State legislation see the Petition of Imperial Irrigation District for Modification of Revised Water Rights Order 2002-0013 filed with the California State Water Resources Control Board on November 18, 2014 (http://www.iid.com/water/salton-sea-initiative/swrcb-petition). For the contractual obligations associated with restoration and mitigation see the Quantification Settlement Agreement Joint Powers Authority Creation and Funding Agreement and the Environmental Cost Sharing, Funding, and Habitat Conservation Plan Development Agreement, both dated October 10, 2003.
12 Section 2.2 of the QSA JPA Creation and Funding Agreement.
13 Articles IX and XIV of the QSA JPA Creation and Funding Agreement.
14 Section 10.1 of the QSA JPA Creation and Funding Agreement.
15 Section 10.3 of the QSA JPA Creation and Funding Agreement.
16 Section 10.2 of the QSA JPA Creation and Funding Agreement.
Nevertheless, the IT provides recommendations to the QSA JPA for adjustments to implementation of the HCP-related mitigation measures and corresponding adjustments to the annual budget. IID coordinates with and keeps the IT informed of air quality mitigation activities to ensure that all activities are in compliance with the HCP and associated permits.

IID, in coordination with the QSA JPA and the IT, prepares an annual budget for review and approval by the QSA JPA. The annual budget is done on a fiscal year basis. As part of that process, IID identifies the air quality mitigation activities that are anticipated for the upcoming year and includes those mitigation costs in the QSA JPA annual budget. Approval of the budget represents a determination by the QSA JPA that the mitigation costs in the budget are subject to reimbursement by the QSA JPA funding. After approval of the budget, IID implements the various mitigation activities included in the annual budget and submits periodic invoices to the QSA JPA for reimbursement. This SS AQM Program anticipates that IID will continue to coordinate with the QSA JPA on inclusion in the annual QSA JPA budget of the air quality monitoring and mitigation activities identified in this program according to the regular process.

### 2.1.3 Salton Sea Mitigation Water

The SWRCB Order requires IID to deliver mitigation water to the Salton Sea for a period of 15 years, until the end of 2017. The mitigation water is delivered to the Salton Sea in accordance with a schedule that increases each year associated with the ramping up of the water conservation schedules for that 15-year period and reaching a peak amount in 2017 of 150,000 acre-feet.\(^{17}\) The primary purpose of the delivery of the mitigation water to the Salton Sea was intended to avoid salinity impacts to the Sea specifically affecting fish and wildlife for 15 years.\(^ {18}\) However, a secondary effect of the mitigation water delivered to the Salton Sea is to artificially supply a portion of the reduced flows to the Sea thereby benefitting the elevation by postponing the recession of the Sea to a significant extent until after the mitigation water ceases to be delivered in 2017. The 15-year period assumed that the State would have a Salton Sea restoration plan developed during that time and implementation of restoration activities would be underway.\(^ {19}\)

### 2.1.4 Salton Sea Restoration

In addition to the QSA mitigation funding obligations, under the QSA and supporting legislation, the State of California has assumed responsibility to restore the Salton Sea, including the associated financial responsibility, with the exception of $30 million in funds contributed to the Salton Sea Restoration Fund by CVWD, SDCWA and IID.\(^ {20}\) The State of California has embarked upon a Salton Sea restoration program.\(^ {21}\) That program is being carried out concurrent with the air quality monitoring and

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\(^{17}\) Exhibit D of the QSA JPA Creation and Funding Agreement.

\(^{18}\) For further details regarding the purpose of the 15 years of Salton Sea mitigation water see the SWRCB Order, the Final Addendum to the IID Water Conservation and Transfer Project, Final EIR dated September 2003, and the HCP.

\(^{19}\) For further detail see IID's SWRCB Petition (footnote 11) and the SWRCB Revised Water Rights Order 2002-0013.


\(^{21}\) See http://resources.ca.gov/salton-sea/.
mitigation activities set forth in this SS AQM Program. IID anticipates that this program and the implementation of the air quality monitoring and mitigation coming out of this program can inform the State’s Salton Sea restoration program and decisions being made under that program. This SS AQM Program provides scientific-based options for addressing air quality that can be used as part of the State’s restoration activities. Nevertheless, the State’s Salton Sea restoration program and funding associated with those restoration activities is separate from this SS AQM Program.

2.2 The Clean Air Act

The CAA is a United States federal law designed to control air pollution at the national level. It requires the Environmental Protection Agency (EPA) to develop and enforce regulations to protect the public from airborne contaminants known to be hazardous to human health. The CAA contains many requirements related to air quality programs and activities. Two areas of those requirements have a direct bearing on this SS AQM Program. They are air quality and emission limitations and plan requirements for nonattainment areas.

The CAA declares that protecting and enhancing the nation’s air quality promotes public health. The law encourages prevention of regional air pollution and establishment of regional control programs. It also provides technical and financial assistance for air pollution prevention at both the state and local government level. The CAA also covers cooperation, research, investigation, training and other activities related to air quality. Grants for air pollution planning and control programs and for interstate air quality agencies and program cost limitations are also included in the CAA.

The CAA mandates air quality control regions designated as either attainment or nonattainment areas. Attainment areas are those that meet the national standards for primary or secondary ambient air quality. Nonattainment areas are those that do not meet the standards. Imperial County and Coachella Valley are currently designated as serious nonattainment areas for PM10.

Additionally, the CAA contains the requirements for nonattainment areas. Under the CAA, states are required to submit a SIP describing how the nonattainment areas will be brought into compliance with federal and state ambient air quality standards. The SIP contains the program for attaining the

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22 42 United States Code sections 7401 et seq.
23 42 USC sections 7401-7431.
24 42 USC sections 7501-7515.
25 42 USC section 7401(b).
26 42 USC sections 7401(a) and (b).
27 42 USC sections 7401(a) and (b).
28 42 USC sections 7402-7403.
29 42 USC sections 7405-7406.
30 42 USC section 7407.
31 42 USC section 7410.
32 42 USC section 7410.
33 42 USC sections 7501-7515.
34 42 USC section 7410.
standards as soon as possible but in no more than five years, based on the severity of the air pollution and the difficulty posed by obtaining cleaner air.\textsuperscript{35}

The CAA is implemented according to Title 40 of the Code of Federal Regulations Part 51. According to the federal regulations, SIPs must include the following elements:\textsuperscript{36}

- \textbf{Emission Inventory}: Detailed inventory of emissions from point and area sources. The inventory must be based upon measured emissions or, where measured emissions are not available, documented emission factors.
- \textbf{Control Strategy}: Control strategy for bringing the area into attainment with federal and state air quality standards. The control strategy should identify the sources to be controlled, as well as the type and intensity of control measures applied to reduce emissions. This includes identification of the responsible agency, as well as procedures for monitoring compliance and handling violations.
- \textbf{Control Estimate}: Summary of emission levels projected to result from application of the control strategy.
- \textbf{Attainment Demonstration Modeling Analysis}: A demonstration of adequacy of the control strategy by means of applicable models, databases and other requirements found in the EPA’s Guideline of Air Quality Models.
- \textbf{Contingency Planning}: Contingency measures to be applied in the event that the standards are not achieved in the specified time period.

SIPs must be approved by the EPA, or revised if approval is contingent on making changes, and must specify whether local governments or the State will implement and enforce the various changes.\textsuperscript{37}

The ICAPCD is the responsible regulatory agency for the SIP in Imperial County and the SCAQMD is the responsible regulatory agency for the SIP in Riverside County. The roles and applicable air quality rules of each local regulatory agency are described below.

\section*{2.3 \textbf{Imperial County Air Pollution Control District}}

The ICAPCD is the local regulatory agency for air quality compliance within Imperial County. The ICAPCD has a board of directors that adopts the policies and regulations for air quality within Imperial County and is managed by the Air Pollution Control Officer. In addition to developing SIPs for Imperial County as required by the CAA, the ICAPCD has adopted the \textit{Rules and Regulations of the Imperial County Air Pollution Control District}, which includes eleven regulations (Regulations I to XI) each of which is broken down into separate rules.\textsuperscript{38}

\textsuperscript{35} 42 USC section 7502.
\textsuperscript{36} 40 CFR Part 51, subpart G.
\textsuperscript{37} 40 CFR Part 51, subparts A and F.
\textsuperscript{38} Located at http://www.co.imperial.ca.us/AirPollution/index.asp?file=icaprules.
2.3.1 IMPERIAL COUNTY PM\textsubscript{10} SIP

On August 11, 2009, the ICAPCD Board held a public hearing and unanimously adopted the Final 2009 Imperial County State Implementation Plan for Particulate Matter Less Than 10 Microns in Aerodynamic Diameter (IC 2009 PM\textsubscript{10} SIP).\textsuperscript{39} The IC PM\textsubscript{10} SIP was based on emission inventory projections for the period of 2006-2010 compared against the baseline year of 2005. Highlights of the IC 2009 PM\textsubscript{10} SIP include the following:

- Five exceedance days (that is, days exceeding the federal 24-hour PM\textsubscript{10} standard) were recorded during the period from 2006 through 2008, with 24-hour average PM\textsubscript{10} concentrations ranging from 167 to 291 micrograms per cubic meter (\(\mu g/m^3\)). For any given exceedance day, from one to five compliance monitors were affected.

- Two of the exceedance days were associated with PM\textsubscript{10} transport from Mexico. On each of these days, a single compliance monitor was affected (Grant Calexico). The remaining three exceedance days were associated with high wind speed conditions. On high wind days, two to five compliance monitors were affected.

- On low wind speed days, significant sources of dust included tilling, entrained dust from unpaved roads and open areas. Ninety-nine percent of emissions from open areas were from non-populated areas such as dunes, grasslands and barren areas.

- On an annual basis, wind-blown dust sources accounted for 73 percent of the total PM\textsubscript{10} emissions in the Imperial County. Other large dust sources include: entrained dust from unpaved roads (19.4 percent of the total) and farming (3.3 percent of the total). All other sources were individually less than one percent of the total emissions.

- The IC 2009 PM\textsubscript{10} SIP control strategy reduced the maximum daily emissions from 235 tons per day (tpd) to 219 tpd, a difference of 16 tpd.

- The control strategy focused on (greatest to least reduction): entrained city/country roads (reduction of 8.04 tpd), tilling (reduction of 2 tpd), non-pasture agricultural land (reduction of 1.99 tpd), other open areas (reduction of 1.19 tpd), wind-blown dust on unpaved farm roads (reduction of 1.11 tpd), wind-blown dust from city/country roads (reduction of 0.69 tpd) and “track out” (reduction of 0.37 tpd). All other sources were individually reduced less than 0.3 tpd.

- The IC 2009 PM\textsubscript{10} SIP assumed a restoration program would be implemented at the Salton Sea and therefore did not account for future emissions from exposed playa.

- Dust emissions from the open desert areas located west of the Salton Sea were not captured by the IID special purpose monitoring network because it had not been established yet and therefore did not influence the IC 2009 PM\textsubscript{10} SIP control strategy.

The ICAPCD is preparing a 2016 PM\textsubscript{10} SIP as required by the CAA and the EPA regulations. This updated PM\textsubscript{10} SIP may evaluate two major changes in the conditions and assumptions used as the basis for the IC

\textsuperscript{39} ENRON International Corporation, 2009 [http://www.arb.ca.gov/planning/sip/planarea/imperial/imperialsip.htm and http://www.co.imperial.ca.us/airpollution/attainment%20plans/final%20ic%202009%20pm10%20sip%20document.pdf].
2009 PM$_{10}$ SIP: (1) a more comprehensive method for estimating exposed playa emissions and (2) CARB certified data from the six special purpose PM$_{10}$ monitors operated and maintained by IID around the Salton Sea (see Section 3.1.2.5.1). The latter changes may influence the overall dust control strategy in Imperial County because the IID special purpose monitors indicate source areas that were either nonexistent in the years leading up to the IC 2009 PM$_{10}$ SIP, or were not captured by the PM$_{10}$ monitoring network established at the time.

2.3.2 **Imperial County Air Pollution Control District Regulation VIII**

The ICAPCD Regulation VIII was adopted on October 10, 1994, and revised on November 25, 1996, to comply with Reasonably Available Control Measures (RACM) to control fugitive dust emissions. On November 11, 2005, this regulation was revised again to include Best Available Control Measures (BACM) and was further divided in a series of seven individual rules. On October 16, 2012, the ICAPCD again adopted revisions to several of the rules contained in Regulation VIII to address further BACM concerns by EPA. On April 12, 2016, the ICAPCD adopted revisions to one rule, Rule 804 pertaining to disturbed open areas and described in further detail below, to provide a process for approval of alternative BACM not already listed as BACM for disturbed open areas in the rule.

Regulation VIII contains BACM as required by the CAA for “serious” PM$_{10}$ nonattainment areas. Regulation VIII requires BACM for source categories such as: construction activities, disturbed open areas, paved roads and agricultural operations. Regulation VIII allows operators to determine the control techniques sufficient to limit visible dust emissions to 20 percent opacity and, if applicable to that source, to implement requirements for a stabilized surface. Dust control plans and recordkeeping are also required under the Regulation’s provisions. Regulation VIII also includes test methods and standards.

Regulation VIII is divided into seven rules. Three of the rules—800, 804 and 806—are relevant to this SS AQM Program. Each relevant rule is described below.

2.3.2.1 **Rule 800, General Requirements for Control of Fine Particulate Matter**

Rule 800 contains the definitions, exemptions, general requirements, administrative requirements and test methods that are applicable to all Regulation VIII rules. Section C of Rule 800 contains the definitions that are essential to understanding each specific rule. Section F contains the general requirements that establish basic guidelines for dust control material(s), specifies requirements that the dust control material(s) must meet ICAPCD, SWRCB, CARB and EPA regulations, and contains guidelines for development of Bureau of Land Management (BLM) and Border Patrol dust control plans. Section G contains administrative requirements for test methods. Appendices A and B contain the test methods for visual determination of opacity and determination of surface stabilization, respectively. The latter contains methods for determining: visible crust strength (ball drop test), threshold friction velocity (sieve measurements to assign soil texture), surface protection from flat and standing vegetation and surface stabilization from rock armor using the rock test method.

Rule 800 requires recreational off-highway vehicle (OHV) areas to apply BACM to mitigate fugitive dust emissions. On each day of an off-road event and/or competition during which 50 average vehicle daily
trips per day will occur on an unpaved road segment, the owner or operator shall limit Visible Dust Emissions (VDE) to 20 percent opacity and comply with the requirements of a stabilized unpaved road by application, reapplication, or maintenance of at least one of the following control measures:

- Watering;
- Applying uniform layer of washed gravel;
- Paving;
- Restricting access;
- Restricting speed below 15 mph;
- Applying chemical or organic dust suppressants;
- Applying “road mix;” or
- Using any other method that can be demonstrated to effectively limit VDE to 20 percent opacity and meets the conditions of a stabilized unpaved road surface.

2.3.2.2 RULE 804, OPEN AREAS

Rule 804 applies within rural areas to any open area of 3 acres or more that contains at least 1000 square feet of disturbed surface area. This rule pertains to the Salton Sea because exposed playa around the Sea qualifies as open areas under this rule. Section D of the rule contains exemptions for agricultural operation sites subject to Rule 806 and recreational OHV Use Areas on public lands subject to Rule 800. Section E contains requirements to apply BACM to limit VDE to 20 percent opacity and meet conditions for stabilized surface, and to install barriers to prevent unauthorized vehicle access to stabilized areas. Section F sets forth the permissible BACM for open areas. BACM for open areas includes: (1) applying water or chemical dust suppressants to all unvegetated areas, (2) establishing vegetation on previously disturbed areas, (3) paving, applying and maintaining gravel, or applying and maintaining chemical dust suppressants and (4) implementing alternative BACM that has gone through the approval process set forth in section G.

2.3.2.3 RULE 806, CONSERVATION MANAGEMENT PRACTICES

Rule 806 applies to all agricultural operation sites of 40 or more acres in size. This rule pertains to the Salton Sea because some exposed playa could be reclaimed for agricultural use (this occurred during previous dry periods). Section C of the rule contains definitions that are essential to understand the main terms and Conservation Management Practices (CMPs) in this rule. Section D contains requirements for agricultural operation sites to implement at least one CMP for land preparation and cultivation, harvest activities, unpaved roads and unpaved traffic areas. This section also contains guidelines for operators to develop alternative CMPs. In addition, this section requires the owner/operator to prepare a CMP plan and make it available upon request. Section E contains CMPs for land preparation and cultivation, harvesting, unpaved roads and unpaved traffic areas. Section F contains guidelines to develop a CMP plan.
2.4 SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

The SCAQMD is the local regulatory agency for air quality compliance within Riverside County. SCAQMD has a governing board that adopts the policies and regulations for air quality within Riverside County and is managed by the Executive Officer. SCAQMD has adopted a SIP specifically for the Coachella Valley, which includes the Salton Sea Air Basin and establishes controls needed to demonstrate expeditious attainment of the PM$_{10}$ standards in that area. SCAQMD has also adopted the *Rules of the South Coast Air Quality Management District*, which includes thirty-five regulations (Regulations I to XXXV) each of which is broken down into separate rules.  

2.4.1 COACHELLA VALLEY PM$_{10}$ SIP

On June 21, 2002, the SCAQMD held a public hearing and adopted the *Final 2002 Coachella Valley PM$_{10}$ State Implementation Plan* (CV 2002 PM$_{10}$ SIP). After years of demonstrating attainment of the PM$_{10}$ standards, PM$_{10}$ levels in the years 1999-2001 did not demonstrate attainment of the annual average PM$_{10}$ National Ambient Air Quality Standards, but Coachella Valley had attained the 24-hour PM$_{10}$ standard since 1993. The CV 2002 PM$_{10}$ SIP addressed the rise in PM$_{10}$ levels and established additional controls needed to demonstrate expeditious attainment of the PM$_{10}$ standards. The CV 2002 PM$_{10}$ SIP modified previous analyses and programs, including additional control measures for construction and earthmoving activities, farming, paved and unpaved roads, parking lots, vacant lands and farming. As required by the CAA and the EPA regulations, the CV 2002 PM$_{10}$ SIP included a revised emissions inventory, a control strategy and a demonstration of attainment. At the time of adoption, the SCAQMD committed to revising the CV 2002 PM$_{10}$ SIP with the latest approved mobile source emission estimates, planning assumptions and fugitive dust source emission estimates.

On August 1, 2003, the SCAQMD held a public hearing and adopted the *Final 2003 Coachella Valley PM$_{10}$ State Implementation Plan* (CV 2003 PM$_{10}$ SIP). The CV 2003 PM$_{10}$ SIP contained an updated emissions inventory, emission budgets and attainment modeling.

2.4.2 SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT REGULATION IV

The SCAQMD Regulation IV generally addresses prohibitions relating to air quality. The rules regulating PM$_{10}$ that are relevant to this SS AQM Program include Rules 403 and 403.1.

2.4.2.1 RULE 403, FUGITIVE DUST

Rule 403 applies to any activity or man-made condition capable of generating fugitive dust. Section C of the rule contains the definitions necessary to understand the rule. Section D sets out requirements and prohibitions relating to fugitive dust emissions. For instance, no person shall cause or allow the

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emissions of fugitive dust from any active operation, open storage pile, or disturbed surface area such that 1) the dust remains visible in the atmosphere beyond the property line of the emission source or 2) the dust emission exceeds 20 percent opacity, if the dust emission is the result of movement of a motorized vehicle. Section G provides exemptions to the rule. Table 1 of the rule sets out control measures permitted to address certain source categories.

2.4.2.2 RULE 403.1, SUPPLEMENTAL FUGITIVE DUST CONTROL REQUIREMENTS FOR COACHELLA VALLEY SOURCES

Rule 403.1 applies only to fugitive dust sources in Coachella Valley. Section C of the rule contains the definitions necessary to understand the rule. Section D sets out the general requirements of the rule. Section E provides the requirements for a fugitive dust control plan and other requirements for construction projects or other earth-moving activities. Section F identifies the requirements for a fugitive dust control plan, including submittal and approval. Section G specifies wind monitoring implementation requirements and Section I provides the exemptions to the rule.

2.5 EPA EXCEPTIONAL EVENT RULE

Because of its extremely dry climate and vast areas of undeveloped desert land, PM$_{10}$ concentrations in Imperial County and the Coachella Valley are dominated by fugitive dust emissions. The primary sources of high PM$_{10}$ concentrations in Imperial County are: (1) soil disturbance caused by wind and human activity, (2) transport of high PM$_{10}$ concentrations from Mexicali, Mexico, and (3) occasionally, wildfires. High PM$_{10}$ concentrations caused by uncontrollable natural events such as high winds and wildfires may qualify as "Exceptional Events" under current EPA rules and therefore may be excluded from compliance calculations. These events must be properly documented according to the EPA's Exceptional Event Rule guidelines. Both ICAPCD and IID will commit resources and work together to 1) identify and document potential exceptional events that may have been influenced by Salton Sea exposed playa and/or open areas in the surrounding area and 2) apply to EPA for concurrence on the documentation in order to exclude these data in future attainment determinations.

3 SS AQM PROGRAM DESCRIPTION

This SS AQM Program is divided into three parts: (1) an updated PM$_{10}$ emission inventory for playa and non-playa sources, (2) a control strategy for playa sources only and (3) a general estimated cost analysis. The program objectives are six-fold:

1. Identify and characterize playa sources as the Salton Sea recedes to facilitate implementation of proactive dust control measures$^{44}$ and BACM (currently defined by Rule 804).
2. Investigate the location, magnitude, seasonality and frequency of dust emissions in the desert areas located west of the Salton Sea. This will facilitate future support documentation to exclude data clearly associated with Exceptional Events.

$^{44}$ This is the monitoring portion of Objective 3.
3. Proactively control dust emissions from exposed Salton Sea playa to prevent the occurrence of significant dust emissions.

4. Pilot-test new dust control measures that are specifically tailored to the climate and soil conditions on and around the Salton Sea playa and that make efficient use of available resources and submit for approval successfully tested dust control measures as potential new alternative BACM according existing rules.

5. Identify opportunities to establish new procedures and rules and/or improve existing procedures and rules to fully and successfully implement this SS AQM Program.

6. Develop a general understanding of associated estimated costs and cost areas needing further analysis.

Objectives 1 and 2 are addressed in the PM$_{10}$ emission inventory section (Section 3.1). Objectives 3, 4 and 5 are addressed in the dust control strategy section (Section 3.2). Objective 6 is addressed in the estimated cost analysis section (Section 3.3).

### 3.1 PM$_{10}$ Emissions Inventory

This section describes the methods used to characterize dust emissions from playa and non-playa sources around the Salton Sea.

#### 3.1.1 Playa Sources

Playa exposure and its associated surface and emissions characteristics are a major focus of this SS AQM Program. Research and monitoring are focused on understanding the location and timing of playa exposure, salt crust surface characteristics and the associated emission potentials.

#### 3.1.1.1 Approach

This section describes the methods that will be used to evaluate playa emissions as the Salton Sea recedes. The generalized approach is as follows:

- Observe and document the extent of playa exposure (see Section 3.1.1.2).
- Characterize the emission potential of exposed playa surfaces (see Section 3.1.1.3).
- Record the time and location of dust plumes or any other indication of dust emission activity (see Section 3.1.1.4).
- Map active source areas using remote sensing methods (see Section 3.1.1.5).
- Quantify total annual and daily dust emissions from active source areas (see Section 3.1.1.6).
- Model dust emissions to evaluate potential impacts at PM$_{10}$ compliance monitors (see Section 3.1.1.7).

Each bullet is described in the sections below. As mentioned above, this information is required to facilitate the proactive dust control planning described in Section 3.2.
3.1.1.2 Playa Exposure

Projecting future playa exposure as well as tracking actual playa exposure and land ownership of exposed playa is an important aspect of this SS AQM Program. Each component is described below.

3.1.1.2.1 Projected Future Exposure

The timing and location of future playa exposure is a function of the hydrologic response of the Salton Sea to external forces, such as inflows, salt loads and evaporation rates. The Salton Sea Accounting Model (SSAM) was originally developed by Reclamation to simulate the effects of the water transfers under the QSA on Salton Sea surface elevation and salinity. In 2006, the hydrologic modeling framework was revised to incorporate additional data, water balance improvements and add flexibility to the model. The updated model is called the Salton Sea Analysis model (or SALSA model) developed for the Programmatic Environmental Impact Report (PEIR) for the Salton Sea Ecosystem Restoration Program, which was prepared under the direction of the California Department of Water Resources and the California Department of Fish and Wildlife\(^45\) on behalf of the Natural Resources Agency.\(^46\) The SALSA model has since been updated further and is referred to as the SALSA2 model. CH2M\(^47\) is currently preparing a hydrology analysis of the Salton Sea using the SALSA2 model. Details regarding the most recent updates to the model and the assumptions used for the hydrology modeling and analysis will be described in a separate report prepared by CH2M for IID anticipated to be released in the summer of 2016.

The SALSA2 modeling and projected Salton Sea playa exposure is important to this SS AQM Program for several reasons. Projecting future exposed playa will assist in the PM\(_{10}\) emission inventory by identifying where, when and the amount of exposed playa that will contribute to the inventory. The SALSA2 modeling will be used for comparative purposes to actual exposed playa as the Salton Sea recedes and will thereby inform the PM\(_{10}\) emission inventory as it is carried out. The comparisons that will be drawn are described in further detail below. Additionally, projections of the exposed playa will be used as a tool for planning and decision-making for determining the best use of resources in implementation of the various steps of this program, including the dust control strategy (Section 3.2). Anticipating where, when and the amount of playa that will be exposed will help shape the development of the dust control strategy. Finally, projecting the exposed playa directly attributable to the water transfers under the QSA will allow for the mitigation requirements under the QSA to be fulfilled in accordance with the QSA Final EIR/EIS and the SWRCB Order. While the SALSA2 model is the most current hydrologic modeling, any future updated modeling and projections can be used in the same manner in this SS AQM Program.

3.1.1.2.2 Actual Playa Exposure

Monitoring of the actual Salton Sea surface elevation and associated playa exposure is important for understanding potential air quality impacts. This information will provide a real-time understanding of actual playa exposure as it occurs and will help to validate the SALSA2 model results. Two independent

\(^{45}\) Formerly the California Department of Fish and Game.

\(^{46}\) Formerly the California Resources Agency.

\(^{47}\) CH2M Hill, Inc.
methods have been developed to quantify actual playa exposure. Each is summarized below. Technical
details on monitoring actual exposed playa are in Appendix B.

**USGS Salton Sea Elevation.** Salton Sea elevation is monitored continuously by the United States
Geological Survey (USGS). The monitored Sea elevation data provide the basis for extracting a
shoreline from high-resolution bathymetric data (Figure 3-1). All data from the USGS gauge are
collected in National Vertical Datum of 1929 (NGVD29). To ensure consistency when using the
bathymetric data or comparing to SALSA2 model results, all data must be converted to North American
Vertical Datum of 1988 (NAVD88) using the standard conversion factor of 2.113 feet (given the
geographic coordinates of the gauge and using the National Geodetic Survey’s VERTCON calculator). GIS
tools have been developed to provide near real-time estimates of shoreline location and therefore playa
exposure (as compared to the modeled projections of playa exposure described above).

A subset of USGS-based Salton Sea elevation and gauge readings have been compiled from 2003 to 2015
(year-end Sea elevations) (Table 3-1). These USGS-based Sea elevation and gauge readings can be
compared to SALSA2 model projections or other hydrologic modeling projections in the future. Results
from this comparison can indicate the accuracy of the modeling projections for Sea elevations and
consistency with the bathymetric data.

<table>
<thead>
<tr>
<th>USGS Gauge Reading (Month)</th>
<th>Average Monthly USGS Salton Sea Elevation (ft NAVD88)</th>
<th>USGS / Bathmetry Playa Exposure (Acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/2003</td>
<td>-229.0</td>
<td>Baseline (0 Acres)</td>
</tr>
<tr>
<td>12/2005</td>
<td>-226.9</td>
<td>207</td>
</tr>
<tr>
<td>12/2006</td>
<td>-227.6</td>
<td>2,071</td>
</tr>
<tr>
<td>12/2008</td>
<td>-228.5</td>
<td>5,244</td>
</tr>
<tr>
<td>12/2009</td>
<td>-229.5</td>
<td>7,653</td>
</tr>
<tr>
<td>11/2011</td>
<td>-230.2</td>
<td>8,254</td>
</tr>
<tr>
<td>12/2013</td>
<td>-230.8</td>
<td>10,029</td>
</tr>
<tr>
<td>11/2014</td>
<td>-232.0</td>
<td>12,787</td>
</tr>
<tr>
<td>06/2015</td>
<td>-231.7</td>
<td>12,074</td>
</tr>
</tbody>
</table>

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48 USGS Site 10254005 Salton Sea NR Westmoreland, CA.
FIGURE 3-1: USGS GAUGE LOCATION AND SHORELINE EXTRACTION PROCESS FOR JUNE 2015

The USGS gauge Salton Sea surface elevation for June 2015 was used to determine actual playa exposure from December 2015 to June 2015.
**Landsat Satellite Imagery**: The accuracy of the USGS gauge-based shoreline is a function of the Salton Sea elevation data from the USGS as well as the precision of the underlying bathymetric data. Therefore, an independent method for assessing exposed playa was developed using satellite imagery. Specifically, the Landsat 5 (1984 to 2013), Landsat 7 (1999 to present) and Landsat 8 (2013 to present) satellites provide current and historic imagery on an 8-to-16-day basis for the Salton Sea. A spectral water index called the Modified Normalized Difference Water Index (MNDWI) (Equation 1) was used to identify standing water associated with the Salton Sea from Landsat imagery. MNDWI is based on the fact that water absorbs energy at shortwave-infrared (SWIR) wavelengths. The integration of the green band into the equation reduces noise associated with other land-based features.⁴⁹ A date-specific threshold of MNDWI was then established to isolate the Salton Sea water body and associated shoreline (Figure 3-2).

**EQUATION 1 - MNDWI**

\[
MNDWI = \frac{\rho_{\text{green}} - \rho_{\text{SWIR}}}{\rho_{\text{green}} + \rho_{\text{SWIR}}}
\]

Table 3-2 depicts the Landsat MNDWI playa exposure compared to USGS gauge Sea elevation playa exposure (year-end Sea elevations). Results indicate that the two methods produce comparable actual playa exposure estimates and are in a 1:1 relationship with an R² of 0.98 (Figure 3-3). Further evaluation of individual dates revealed that the USGS gauge and bathymetric approach over-estimated playa exposure in the southern portion of the Salton Sea north of the Alamo River (Figure 3-4). These differences are likely due to errors in the bathymetric model. Acoustic sonar data (captured in 2005 and used as the basis for the bathymetric model) are unreliable in waters less than 1-meter deep (e.g. bay areas around the New and Alamo Rivers). The Landsat MNDWI does not rely on the bathymetric data, so it is able to accurately quantify the Salton Sea extent and therefore playa exposure (Figure 3-4).

Actual playa exposure will continue to be monitored and reported on a quarterly basis using the Landsat imagery as well as the USGS Sea elevation approach. Results of the quarterly monitoring will be shared with the Imperial County and ICAPCD. Results will also be used to update future SALSA2 model projections. Technical details on the monitoring are provided in Appendix B.

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Figure 3.2. LANDSAT MIRRED PAPA EXPOSURE ESTIMATE

Landsat imagery and the MIRRED water bodies used to delineate the Salton Sea shoreline for 2003 and 2015.
**Table 3-2. Landsat MNDWI and USGS Gauge Playa Exposure Estimates**

<table>
<thead>
<tr>
<th>Landsat MNDWI Date</th>
<th>Landsat MNDWI Playa Exposure (Acres)</th>
<th>USGS Gauge Reading (Month)</th>
<th>Average Monthly USGS Salton Sea Elevation (ft NAVD88)</th>
<th>USGS / Bathymetry Playa Exposure (Acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/15/2003</td>
<td>Baseline (0)</td>
<td>12/2003</td>
<td>-229.0</td>
<td>Baseline (0)</td>
</tr>
<tr>
<td>12/06/2006</td>
<td>1,848</td>
<td>12/2006</td>
<td>-227.6</td>
<td>2,071</td>
</tr>
<tr>
<td>12/11/2008</td>
<td>3,565</td>
<td>12/2008</td>
<td>-228.5</td>
<td>5,244</td>
</tr>
<tr>
<td>12/14/2009</td>
<td>7,050</td>
<td>12/2009</td>
<td>-229.5</td>
<td>7,653</td>
</tr>
<tr>
<td>12/25/2013</td>
<td>10,242</td>
<td>12/2013</td>
<td>-230.8</td>
<td>10,029</td>
</tr>
<tr>
<td>11/26/2014</td>
<td>13,470</td>
<td>11/2014</td>
<td>-232.0</td>
<td>12,787</td>
</tr>
<tr>
<td>06/22/2015</td>
<td>12,619</td>
<td>06/2015</td>
<td>-231.7</td>
<td>12,074</td>
</tr>
</tbody>
</table>

**Figure 3-3. Landsat MNDWI vs. USGS Gauge Playa Exposure**

Landsat MNDWI playa exposure regressed against USGS gauge estimates. Results show the strong relationship and consistent relationship between the two actual playa exposure monitoring methods.

**Actual Playa Exposure Comparison**

- **USGS Gauge vs. Landsat Playa Exposure**
- **1:1 Line**
- **Regression Line $R^2 = 0.98$**
Figure 3-d. LANDSAT MNOI and USGS Gauge Exposures for 2008

Landsat imagery was able to accurately capture the shoreline in 2008 around the Alamo and New River areas. These shallow water areas have limited acoustic data for generation of the bathymetric layer and therefore are more error prone when used to generate plume exposure at certain Salton Sea elevations.
3.1.1.2.3 Exposed Playa Land Ownership

The incremental projected and actual playa exposure data will be overlain with land ownership information. Landowners are responsible for compliance with the air quality requirements contained in the local rules and regulations within that district (i.e., ICAPCD or SCAQMD). The playa exposed as a direct result of the water transfers under the QSA involves the added monitoring and mitigation requirements under the QSA Final EIR/EIS and the SWRCB Order. This added layer of compliance does not change the underlying air quality requirements for land within either local district. The overlay of the projected and actual playa exposure data with the land ownership information simply provides planning level information of land actually impacted or expected to be impacted by the receding Salton Sea.

3.1.1.3 Surface Characteristics

Playa salt crusts, sand sheets, beach deposits and soil surfaces (surfaces) are a major focus of this SS AQM Program because they represent potential sources of PM\(_{10}\) emissions. The mechanisms for production of PM\(_{10}\) emissions from playas are relatively well understood. In general, large sustained emissions from playas occur when sand, or sand-sized particles, are moved by high wind (generally 15 miles per hour or greater) such that they begin to bounce or “saltate” across the playa surface. As the moving particles repeatedly impact the fragile salt crust, they can dislodge smaller particles into the air and generate dust. This also can expose underlying and sometimes more erodible soil layers. While the mechanism of saltation is well understood, the vulnerability of different playa surfaces to erosion is not well understood and is known to be highly variable (both spatially and temporally). For instance, some playa surfaces have characteristics that make them more susceptible to erosion (i.e., fluffy, loose salt crust), whereas other surfaces are rigid and sturdy and strongly resist erosion.

Overall, playa surfaces dominated by coarser-textured (sandy) soils have more predictable emissions because emissions are largely a factor of saltating sand. In contrast, emissions from playa surfaces with finer-textured, clay soils have less predictable emissions because of sensitivity to environmental influences (e.g., climatic, hydrologic and anthropogenice). For example, annual weather patterns, including timing of precipitation events, high wind speeds, diurnal temperature changes, depth to groundwater and relative humidity can cause playa surface mineralogy dynamics to change, and increase (or decrease) the potential risk of erosion. The emission inventory under this SS AQM Program will identify the playa surface characteristics and surface mineralogy dynamics that create salt crust conditions vulnerable to erosion. These activities will be designed to provide a better understanding of salt crust formation and erosion at the Salton Sea.

Research and monitoring of playa surface characteristics are divided into two broad categories: existing playa and future playa. Each is described below. Technical details on this monitoring approach are provided in Appendix B.

3.1.1.3.1 Existing Playa

Existing playa surfaces provide insight into the range of conditions that may be reasonably expected as other playa surfaces are gradually exposed. Specifically, properties controlled by evaporate (water-
soluble salt) mineral dynamics (e.g., surface type, surface crust thickness and surface crust hardness) will be mapped and monitored because they are directly related to the spatial and temporal nature of PM$_{10}$ dust emissions.\textsuperscript{50}

Extensive playa surface survey monitoring methodology originally developed for Owens Lake is being adapted for use at the Salton Sea. This includes monitoring protocols and methodology to accurately map existing playa surface characteristics (analogous to soil map units) using remotely sensed data resources and ground-based surface evaluations. Ground-based surface evaluations include detailed characterization of surface properties related to erosion (Table 3-3). These datasets will then be used as calibration data to spatially map playa surface types, vegetation and other surface characteristics using LiDAR (Light Detection and Ranging), UAV (unmanned aerial vehicle) imagery and other sources of satellite-based imagery (Figure 3-5). These mapping efforts will be done periodically to provide an updated inventory of exposed playa surface units and associated physical characteristics. These data will be used in the assessment of playa emissions potential (see Section 3.1.1.4). Surface classification and mapping methodology will be further adapted as playa exposure progresses and a wider diversity of playa surface categories may become apparent.

FIGURE 3-5. EXAMPLE PLAYA SURFACE CLASSIFICATION MAP

This table surface classification map was developed using high-resolution aerial imagery and LiDAR data. Maps surface map units and vegetation characteristics provide information related to wetlands potential of exposure playas.

Legend

Exposed Playa Classification

- Early post-volcanic playa vegetation
- Late post-volcanic playa vegetation
- Emerged Nafusa (25-50% Crown)
- Emerged Nafusa (>50% Crown)
- Other growth within shrubs
- Old growth across shrubs
- Granit, Sand
- Playa Smokey
- Playa Wet Area
- Playa Outwash
- Playa Beach
- Vegetated Unit
- Water
TABLE 3-3. SURFACE PROPERTIES COLLECTED DURING SURFACE CHARACTERIZATION EVENTS

<table>
<thead>
<tr>
<th>Surface Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crust Type</td>
<td>Crust categories may include: smooth, botryoidal, weak botryoidal, hummooky and networked. The dominant crust type of the observation area will be characterized, and if other types are present in smaller amounts, they will be noted as inclusions. Additional crust categories may be developed specifically for the Salton Sea Playa.</td>
</tr>
<tr>
<td>Crust Thickness</td>
<td>Crust thickness is measured from the top of salt crust to the top of soil. In some places, the salt crust will be divided into two distinctly different layers: top crust and sub crust. Top crust is usually a harder, salt-cemented crust that forms a shell over the surface. Sub crust usually has weak structure (i.e., soft or crumbly) and extends from the bottom of the top crust to the underlying, often looser soil. In some cases, a top crust will exist without a sub crust and will be directly overlaying the soil. Total crust thickness is considered the sum of top crust and sub crust.</td>
</tr>
<tr>
<td>Soil Moisture</td>
<td>Soil moisture will be qualitatively assessed for the first one to two inches of soil directly below the crust. Soil moisture can be classified based on USDA-NRCS classification parameters (Schoonenberger et al., 2002). Soils will usually range from slightly moist to saturated where crust exists and dry to saturated where no crust exists.</td>
</tr>
<tr>
<td>Crust Relief</td>
<td>Crust relief is measured to provide a more refined understanding of surface roughness. Roughness affects wind resistance and surface wind velocities and is therefore useful in wind-erosion modeling. Crust relief is determined by measuring the distance from the bottom of a crust depression to the top of a typical crust ridge. Networked, botryoidal and hummooky crusts usually have the greatest relief.</td>
</tr>
<tr>
<td>Crust Hardness</td>
<td>Crust hardness indicates the degree of erosion resistance. Crust hardness can be characterized by the amount of force necessary to crush the salt crust by hand according to USDA-NRCS guidelines (Schoonenberger et al., 2002). On average, smooth and weak botryoidal crust types are the softest, while networked and hummooky crusts are harder. Hardness of both top crust and sub crust will be assessed if distinct surface and sub crusts are present. In addition, the &quot;ball drop method&quot; will be used to evaluate crust hardness at each location using Rule 800 specifications.</td>
</tr>
<tr>
<td>Penetration Resistance</td>
<td>Penetration resistance can be measured with a penetrometer. A penetrometer is inserted through the total crust depth to assess crust resistance. Local penetration resistance can vary substantially and will be measured at several points to calculate an average penetration resistance for a crust type.</td>
</tr>
<tr>
<td>Surface Erosion</td>
<td>Surface erosion is generally characterized as a percentage of total crust area that appears to have been eroded by wind. This can be done with visual or remote-sensing techniques.</td>
</tr>
<tr>
<td>Free Surface Sand</td>
<td>Free surface sand is visually determined by estimating the percentage of free, sand-sized particles in a square meter of playa surface. The amount of free sand can vary seasonally with crust development, because forming crusts can encapsulate surface sand as they harden. Free sand particles on the surface are often very fine and settle into very small depressions in crust surfaces.</td>
</tr>
<tr>
<td>Percentage Vegetation, Overflow</td>
<td>Percent surface area of vegetative cover, dune area, berm area, overflow area and representative playa area will be estimated. These estimates will provide a distribution of small inclusions relative to the dominant mapped surface condition. These features also have implications for the formation of crusts and erodibility; percent overflow area and vegetative cover are probably the most influential of these features. The surface area assessment can be performed visually (from the ground) or using remote-sensing techniques.</td>
</tr>
</tbody>
</table>

3.1.1.3.2 FUTURE PLAYA

This SS AQM Program will assess inundated playa soils using datasets and analyses related to Salton Sea floor bathymetry and sediment characteristics. Acoustic sonar data collected by the Bureau of Reclamation were analyzed to provide planning level information on surface soil characteristics of the currently inundated playa. These data were collected at two sonar frequencies (50 kHz and 200kHz) and combined with ground-truth data of soil sediment characteristics (Figure 3-6). The resulting spatial maps predict surface sediment texture, soft sediment depth, surface roughness/complexity and barnacle bed locations. These data are valuable for understanding the types of soils and surfaces that
will be exposed as the Salton Sea recedes and for establishing monitoring protocols for specific soil types. In addition, results also provide insight into the types of dust control measures that may work well in specific regions of future exposed playa.

If additional datasets and analyses are required to provide greater detail on currently inundated playa soils, then they will be developed as part of this SS AQM Program. This may include optical Salton Sea floor mapping products designed to quantify sediment characteristics. This can be accomplished using various techniques, but the most promising technique is Sediment Profile Imaging (SPI). SPI is an optical remote monitoring technique used to image, measure and analyze the physical, chemical and biological parameters in aquatic environments to a depth of eight inches or more.

3.1.1.4 ASSESSING THE EMISSION POTENTIAL OF EXPOSED PLAYA SURFACES

This SS AQM Program will assess which playa surfaces and conditions are actually emissive and identify source areas associated with erosion events. This section describes the purpose of assessing emission potential, the field measurement system and the sampling program.

3.1.1.4.1 PURPOSE

Periodically assessing the emission potential of exposed Salton Sea playa will serve three purposes:

1. Periodic updating of the emission inventory for exposed Salton Sea playa. To the extent practical, the emission inventory will be refined to differentiate the active exposed playa sources (see Section 3.1.1.5).
2. Characterizing the “dust season(s)” on the Salton Sea playa; that is, the times of the year when dust emissions typically occur under different climate and soil conditions.
3. Establishing PM$_{10}$ emission rates (in units of mass per unit area per unit time, e.g. µg/m$^2$) for different types of exposed playa. The data will be used to model the PM$_{10}$ contributions at nearby monitoring stations.

The next two sections describe the measurement system and how it will be used on Salton Sea playa.

3.1.1.4.2 FIELD MEASUREMENT SYSTEM

The emission potential of exposed playa surfaces will be assessed using a device called the Portable In-Situ Wind Erosion Laboratory (PI-SWERL), developed by Vicken Etyemezian and others at the Desert Research Institute, Reno, Nevada (Figure 3-7). The PI-SWERL instrument is an open-bottomed, cylindrical chamber with a top-mounted, direct-current motor that spins a metal ring inside the chamber about 2.5 inches above, and parallel to, the soil surface. Principles of fluid mechanics allow simulation of the turbulence conditions that produce dust storms in the surrounding environment. The spinning ring creates a shear stress profile (which produces turbulence), lofting soil and dust particles, and passing them through particle samplers (both sand-sized and dust-sized particles). The PI-SWERL electronically measures the number and size of suspended particles over the duration of a test cycle, typically less than 10 minutes. By controlling the speed of the ring to simulate varying wind speeds, the potential for a soil surface to produce PM$_{10}$ dust emissions can be determined under a range of simulated wind conditions.
The PI-SWERL is a highly portable, easy-to-use device that measures potential sand motion and dust emissions from surfaces under field conditions. The advantage of the PI-SWERL over the traditional rectangular field wind tunnels is its portability combined with rapid testing at a site. The ease and speed of conducting tests allows the investigator to perform many replicate measurements in an efficient manner (typically 25-35 tests daily). The instrument has been used to evaluate potential sand motion and PM$_{10}$ emissions throughout the southwestern United States, as well as abroad.\textsuperscript{51}

\textbf{3.1.1.4.3 PI-SWERL OPERATION ON SALTON SEA PLAYA}

This SS AQM Program includes a PI-SWERL sampling program. PI-SWERL sampling will occur monthly on each identified playa surface type, barring wet soils or other conditions that might limit site access. Monthly results will facilitate a better understanding of the “dust season” on different parts of the

Salton Sea playa. Each surface type will be randomly sampled with a fixed number of replications. Replications are essential for understanding the range of variability that exists within an identified surface type.

The PI-SWERL sampling program will occur across the entire exposed playa, not just the portion that is actively emissive. However, additional sampling will occur within and around the active source areas. Appendix B contains a detailed sampling plan, including the process for determining the number of sampling locations and replications within each surface type.

3.1.1.5 Delineating Active Areas on Exposed Playa

The success of the proactive dust control program described in Section 3.2.1 depends on having available the means to quickly and reliably map dust sources over the vast areas of exposed Salton Sea playa. An efficient way to accomplish this would be to take high-resolution aerial photographs of the playa during high-wind events. The photographs would be evaluated to reveal areas with the highest dust concentrations, which would help to differentiate source areas from more dispersed dust plumes. Relatively low-altitude flights over the surface should allow closer inspection of surface activity.

Another approach, albeit somewhat more complicated and costly, would involve traversing the playa with scanning LiDAR mounted on a commercial aircraft. Dust sources would be revealed by filtering out the ground and any low-return-intensity signals indicating a dispersed dust plume. The filtered results would be associated with the highest dust concentrations from or near the point of emissions.

Mapping the playa several times during a single high wind event and then comparing the results across several high wind events would produce a greater understanding of where and how often dust emissions are occurring on the playa. The information would be applied to help prioritize proactive dust controls. Both aerial mapping methods are expensive, but would produce far greater certainty than other fixed monitoring technologies and would lead to a far more cost-effective system than simply placing dust control measures everywhere on the playa.

Several organizations and vendors have this capability, including NASA’s Jet Propulsion Laboratory in Pasadena, California. An on-call contract would be necessary to ensure that aircraft can be deployed as needed during active dust storms.

3.1.1.6 Estimating Emissions on Active Areas

The PI-SWERL sampling and active area delineation will enable two types of emission estimates: maximum daily emissions (tpd for active source areas) and total annual emissions (tons per year [tpy] for all active source areas). Each is described below.

3.1.1.6.1 Maximum Daily Emissions

The PI-SWERL-measured emission potential is expected to vary over time depending on the surface type, climate conditions (e.g., temperature, wind speed, wind direction) and other factors. Similarly, the source areas active at any one time are also expected to vary by the same conditions. Accordingly, the maximum daily emissions will be computed by multiplying the maximum daily active area (in square
meters) by the maximum emission potential (in grams of PM$_{10}$ per square meter per day) for each identified source type. The sum of all the source types on the playa yields the maximum daily emissions for the entire playa (converted to tpd). Maximum daily emissions will be computed on a yearly basis.

3.1.1.6.2 TOTAL ANNUAL EMISSIONS

In similar fashion, the total annual emissions will be estimated by summing the product of the average active area per month (in square meters) by the average emission potential (in tons of PM$_{10}$ per square meter per month) for all source types and months. The final units will be in tpy.

3.1.1.7 MODELING IMPACTS AT MONITORING STATIONS

The CALPUFF modeling system will be used to model the impact of the maximum daily emissions from exposed playa sources at monitoring stations located around Imperial and Riverside Counties. The purpose is to assess the relative contribution of exposed playa sources at the monitors. The difference between the observed PM$_{10}$ concentrations at the monitors and the CALPUFF-predicted PM$_{10}$ concentration is that the CALPUFF emission rates will be based on the maximum daily emission estimate (see Section 3.1.1.6.1).

3.1.2 NON-PLAYA SOURCES

This section describes the methods used to evaluate dust emissions from the open areas around the Salton Sea. This section also summarizes the methods used to compute total annual emissions and maximum daily emission rate by surface type within the area of interest (AOI). The approach, AOI, surface types, monitoring and estimation of emission rates are described below. Detailed technical information on the off-Sea inventory plan is provided in Appendix C.

3.1.2.1 APPROACH

Several lines of evidence will be used to establish the location, timing and magnitude of dust emissions from off-Sea areas, including: (1) “PM$_{10}$ roses” using data from the PM$_{10}$ monitoring network on the west side of the Salton Sea; (2) a network of fixed sand motion monitoring instruments placed within various surface types; (3) video monitoring to provide visual evidence of dust emissions; and (4) PI-SWERL sampling to characterize the emission potential of various surface types.

This information will be used to confirm the location and timing of off-Sea emissions and to support an updated PM$_{10}$ emission inventory that may be used for the revised Imperial County PM$_{10}$ SIP (see Section 2.3.1).

3.1.2.2 AREA OF INTEREST

The off-Sea inventory AOI is a 5,805-square-mile area that encompasses the Salton Trough and portions of the surrounding mountain ranges (Figure 3-8). Its southern margin follows the Mexican-American border. It does not include the agricultural areas of the Imperial and Coachella Valleys, nor the Salton Sea. This AOI extent was chosen because it represents the majority of desert surfaces that account for open-area emissions in the Salton Sea Air Basin.

PM$_{10}$ roses are similar to wind roses; however, in the case of the former, the “petals” show the frequency, magnitude and direction of PM$_{10}$ concentrations rather than wind speed.
Figure 3-8. Off-Sea Source Inventory Area of Interest (AOI)

The extent of the off-sea source inventory AOI encompasses the desert surface in the Salton Sea Air Quality contributing to open-area emissions.
3.1.2.3 Surface Types

A surface type classification system was developed in order to quantify off-Sea dust sources. The classification system was created by researching the desert surfaces present in the region, targeted field investigations and the photointerpretation of satellite imagery. The surface types used in this classification system are detailed below (Table 3-4 and Figure 3-9, Figure 3-10, Figure 3-11 and Figure 3-12). Vegetative cover and surface armoring will be spatially mapped using remote sensing based imagery techniques.

**Table 3-4. Off-Sea Surface Classification Legend**

<table>
<thead>
<tr>
<th>Class</th>
<th>Sub-Class</th>
<th>Description</th>
<th>Erosion Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Dry Wash Units</td>
<td>Sand Dominated</td>
<td>Ephemeral drainage dominated by well sorted, fine to coarse grained sand.</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Silt Dominated</td>
<td>Ephemeral drainage dominated by silt. Undisturbed silt found in dry washes is often present as a fragile thin mud-cracked sheet.</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Gravel Dominated</td>
<td>Ephemeral drainage dominated by gravel.</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Gravel and Sand</td>
<td>Ephemeral drainage consisting of gravel evenly distributed among a sandy matrix. Poor to moderately sorted. The upper surface often has been coarsened by wind erosion and/or OHV activity.</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Gravel and Silt</td>
<td>Ephemeral drainage consisting of gravel evenly distributed among a silty matrix. Poor to moderately sorted. The upper surface often has been coarsened by wind erosion and/or OHV activity.</td>
<td>Medium</td>
</tr>
<tr>
<td>2-Alluvial Fan Units</td>
<td>Sand Dominated</td>
<td>Alluvial fan deposits consisting of primarily sand. Typically located near the periphery of the fan.</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Sand and gravel</td>
<td>Alluvial sand capped by gravel lag. Typically located near the middle of the fan.</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Cobbles</td>
<td>Alluvial fan deposits consisting of sand, gravel and cobbles. Typically located near the top of the fan.</td>
<td>Low</td>
</tr>
<tr>
<td>3-Sand Units</td>
<td>Sand Dunes</td>
<td>Active aeolian dune and erosional interdune surface. Large asymmetrical, elongated Transverse dunes are the most common in this region. Dunes are &gt; 1.5 M and typically fine to medium grained.</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Sand Sheet</td>
<td>Active aeolian deposit. Flat to low angle, uniform, expansive sand surface. Typically fine to medium grained.</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Sand over Alluvium</td>
<td>Sand sheets and coppice dunes &lt; 1.5 m in height superimposed on alluvium. Coppice dunes are small vegetated sand mounds that form when a shrub impedes the flow of air and causes sand grains to settle out on the downwind side of the shrub.</td>
<td>High</td>
</tr>
<tr>
<td>4-Paleo Lakebed</td>
<td>Silt-Dominated</td>
<td>Well sorted lacustrine silt deposits from pre-historic Lake Cahuilla.</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Cobble over Silt</td>
<td>Large Cobbles regularly distributed among silt situated along the margin of pre-historic Lake Cahuilla. The cobbles serve as armory for the vulnerable underlying silt. The cobbles were deposited by wave action from Lake Cahuilla.</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Gravel and Sand</td>
<td>A mixture of gravel and sand present on old beach ridges formed by wave action.</td>
<td>Low</td>
</tr>
<tr>
<td>6-Rock Units</td>
<td>Sandstone</td>
<td>Highly friable, heavily eroded sandstone. Often taking the form of steep gullies.</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Bedrock</td>
<td>Undifferentiated bedrock. A consolidated hard surface that is not emissive.</td>
<td>Very Low</td>
</tr>
<tr>
<td>Class</td>
<td>Sub-Class</td>
<td>Description</td>
<td>Erosion Risk</td>
</tr>
<tr>
<td>------------</td>
<td>------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>7-</td>
<td>Offshore Playa</td>
<td>Independent depressions that once held water and now have formed evaporites among very delicate mud-cracked silt. The underside of the mud cracks has a distinct micaceous sheen.</td>
<td>High</td>
</tr>
</tbody>
</table>

**Figure 3-9. (A) Sand-Dominated Dry Wash with Heavy OHV Traffic and (B) Gravel- and Sand-Dominated Alluvial Fan**

A. Sand-Dominated Dry Wash with Heavy OHV Traffic  
B. Gravel- and Sand-Dominated Alluvial Fan

**Figure 3-10. (A) Large Sand Sheet and (B) The Algodones Dune Field**

A. Large Sand Sheet  
B. The Algodones Dune Field
3.1.2.4 Off-Sea / Open Area Land Ownership

The majority of the land within the off-Sea inventory AOI is owned by the federal government, the State of California and private landowners. In the east, the Algodones Dunes, the Chocolate Mountains and portions of the Mecca and Indio Hills are owned by the federal government. They also own the San Jacinto Mountains in the northwest and a large portion of the land south of the Superstition Hills. The State of California owns the Santa Rosa Mountains, Anza Borrego State Park and a large portion of the surrounding area in the west. Private land is interspersed throughout the AOI.
3.1.2.5 Monitoring Components

The monitoring components needed to confirm the location and timing of off-Sea emissions and to support an updated PM$_{10}$ emission inventory are discussed below. Appendix C contains a more detailed description of each component.

3.1.2.5.1 Ambient PM$_{10}$ Concentrations

Since February 2010, five-minute- and one-hour-average ambient PM10 concentrations have been recorded continuously at six locations around the Salton Sea, including two on the west side of the Salton Sea: one at Salton City and the other at the Naval Test Station (Figure 3-13). All stations measure PM$_{10}$ as well as particulate matter less than 2.5 microns in aerodynamic diameter, or PM$_{2.5}$ (Table 3-5). The PM coarse fraction is calculated as: PM$_{\text{Coarse}} = \text{PM}_{10} - \text{PM}_{2.5}$.

All six stations have all been in continuous operation since the start of the program. For the first two years, ICAPCD maintained the instruments and CARB conducted annual audits of the instruments. However, in July 2011, IID took over responsibility for operating and maintaining the PM$_{10}$ network. IID is also responsible for operating and maintaining the meteorological instruments described in the next section.

**Figure 3-13. Salton Sea PM10 Monitoring Locations**
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Instrument</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Particulate Matter Concentrations</td>
<td>Thermo Fisher Scientific TEOM 1405-D</td>
<td>Real-time measurements of PM&lt;sub&gt;10&lt;/sub&gt; and PM&lt;sub&gt;2.5&lt;/sub&gt;</td>
</tr>
<tr>
<td>3-Dimensional Wind Speed and Direction</td>
<td>R. M. Young Sonic Anemometer, Model 8100</td>
<td>10-meter height</td>
</tr>
<tr>
<td>Horizontal Wind Speed</td>
<td>R. M. Young Gill 3-Cup Anemometer, Model 12101</td>
<td>1-, 2- and 10- meter heights</td>
</tr>
<tr>
<td>Ambient Temperature</td>
<td>R. M. Young Platinum Temperature Probe, Model 41342VF</td>
<td>2-meter and 10-meter with aspirated radiation shields</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>R. M. Young Relative Humidity/Temperature Probe, Model 41382VF</td>
<td>2-meter with multi-plate radiation shield</td>
</tr>
<tr>
<td>Net Radiation</td>
<td>Met One Instruments Net Radiometer, Model 097</td>
<td>1-meter</td>
</tr>
</tbody>
</table>

The PM<sub>10</sub> data, along with the meteorological data described in the next section, will be used to generate dust (or PM<sub>10</sub>) roses for the west side of the Salton Sea. PM<sub>10</sub> roses are especially useful because they are easy to interpret and reveal the frequency, magnitude and direction of dust sources affecting each PM<sub>10</sub> monitor. An example set of PM<sub>10</sub> roses is presented in Figure 3-14. Note that for the year 2014, significant dust sources existed in the desert area west of the Naval Test Station (NTS) monitor and west-southwest of the Salton City (SC) monitor. Appendix C contains a detailed description of the ambient PM<sub>10</sub> monitoring protocol.
### 3.1.2.5.2 Meteorology

The TEOMs described in Table 3-5 each have a co-located 10-meter-tall meteorological tower equipped with the instruments needed to calculate surface roughness length as well as to support standard regulatory air dispersion models (e.g., AERMOD and CALPUFF). The meteorological instruments mounted on each tower are summarized in Table 3-5. The three-dimensional sonic anemometer data are used to calculate five-minute and hourly wind directions.

### 3.1.2.5.3 Sand Motion

Sand motion monitors, including sensits and Cox Sand Catchers (CSC), will be used to establish real-time horizontal sand fluxes on the various off-Sea surface types identified within the AOI. Horizontal sand flux data, combined with surface-type-specific emission factors (either from published scientific literature or from the PI-SWERL), will be used to calculate vertical PM$_{10}$ fluxes on the surfaces. The individual-area PM$_{10}$ fluxes (in grams of PM$_{10}$ per square meter per hour) will be summed to yield the area-wide PM$_{10}$ emissions. Appendix D contains a detailed description of the sand motion monitoring protocol.
3.1.2.5.4 PI-SWERL SAMPLING

PI-SWERL sampling will occur periodically on the surface types identified within the off-Sea inventory AOI. Appendix D contains a detailed description of the PI-SWERL sampling protocol.

3.1.2.5.5 VIDEO MONITORING

Portable video monitoring systems will be scattered around the AOI, focused primarily on the most active dust-producing areas west of the Salton Sea. Appendix D contains a detailed description of the video monitoring protocol.

3.1.2.6 ESTIMATING EMISSION RATES

The various types of monitoring and active area delineation will enable two types of emission estimates: maximum daily emissions (tpd for active source areas) and total annual emissions (tpy for active source areas).

3.1.2.6.1 MAXIMUM DAILY EMISSIONS

Maximum daily emissions will be computed by each of the following methods:

- Method 1: Worst-day measured horizontal sand fluxes coupled with PI-SWERL-generated emission factors.
- Method 2: PI-SWERL-generated vertical PM₁₀ fluxes (varies with surface friction velocity, u*) coupled with CALMET⁵³ estimates of surface friction velocity as a function of the worst-day meteorology.

Each of these methods will be applied to individual source areas identified using the methods described in Section 3.1.2.2, Area of Interest. The individual-area results will be totaled to yield the maximum daily emissions for the AOI. The results will be expressed in units of tpd.

3.1.2.6.2 TOTAL ANNUAL EMISSIONS

The total annual emissions will be calculated using the same methods outlined above in Section 3.1.2.6.1, except that the worst-day horizontal sand fluxes in Method 1 will be replaced with average daily horizontal sand fluxes (averaged over one year) and the PI-SWERL-generated vertical PM₁₀ fluxes in Method 2 will be applied for each day of the year (i.e., using the meteorology from each day) and then summed. The results will be expressed in units of tpy.

3.1.3 UPDATES TO THE EMISSION INVENTORIES

The Salton Sea playa emission inventory described in Section 3.1.1 will be updated annually. Monitoring results related to the location and timing of playa exposure, salt crust surface characteristics and the

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⁵³ CALMET, part of the CALPUFF modeling system, is a diagnostic meteorological model that reconstructs 3-dimensional wind and temperature fields starting from meteorological measurements, orography and land use data.
http://www.arb.ca.gov/html/soft.htm

44
associated emission potentials will be evaluated on an on-going basis and may be done in consultation with the Imperial County and ICAPCD. Results will be used to (1) identify and prioritize implementation of proactive DCMs on active source areas and (2) inform development of Annual Proactive Dust Control Plans (Section 3.2.1.2).

For purposes of this SS AQM Program, the off-Sea emission inventory described in Section 3.1.2 is currently planned to be performed only once unless and until it is necessary to perform this inventory again due to substantial changes in the off-Sea emission sources. However, Imperial County, ICAPCD and/or IID may choose to update the off-Sea emission inventory at any time for any reason or in the event the source characteristics change (either for better or worse). The updated inventories may consider the use of new technologies and methods as they become available.

3.2 DUST CONTROL STRATEGY

This section describes the dust control strategy for PM$_{10}$ emissions from exposed Salton Sea playa. The main components of the dust control strategy will be collaboratively developed with the Imperial County and ICAPCD, and include the following:

- Develop and implement proactive dust control measures (DCMs) to prevent source areas from becoming a significant source of PM$_{10}$ emissions. This includes development and testing of new DCMs that are specifically tailored to the climate and soil conditions on and around the Salton Sea playa.
- Develop a dust control strategy that can comply with the ICAPCD Regulation VIII rules to the maximum extent possible, utilizing opportunities for alternative BACM to be approved, and identify opportunities to establish new procedures and rules and/or improve existing procedures and rules to fully and successfully implement an effective dust control strategy.
- Develop and implement a playa traffic management plan focused on public outreach and education to prevent disturbance and erosion due to off-highway vehicle (OHV) traffic.

3.2.1 CONCEPTUAL PROACTIVE DUST CONTROL STRATEGY

The goal of proactive dust control is to prevent exposed Salton Sea playa from becoming a significant source of PM$_{10}$ emissions, which will help protect the public health of the communities near and around the Sea. The proactive dust control strategy would be collaboratively developed with the Imperial County and ICAPCD. It will include broad-scale implementation of DCMs that are protective of air quality, but that are also adaptable given the unknowns regarding temporal exposure and the magnitude of future emissions. As playa is exposed, the surface characteristics and emission potential will be rigorously evaluated (see Section 3.1.1). Initially, results from these evaluations will be used to establish criteria to identify and prioritize areas of exposed playa that have high emission potential. Criteria will be developed for each playa evaluation method (e.g., PI-SWERL data, video monitoring), such that any individual line of evidence could be used to prioritize proactive control areas. Once the criteria are established, IID will use the monitoring results to develop and implement an Annual Proactive Dust Control Plan. Results from the active source delineations will be used to prioritize DCM implementation on an on-going basis. This process is illustrated in Figure ES-1.
Each site would be monitored after DCM implementation to confirm that adequate surface stabilization is maintained. If the initial proactive DCM implementation on the site does not achieve a stabilized surface or if visible emissions occur, then the DCM would be further enhanced. This approach allows resources to be allocated efficiently and effectively, and in an expeditious manner to prevent significant sources of PM_{10} emissions.

The success of a proactive dust control strategy requires the development and testing of DCMs that can be quickly implemented, adequately maintain a stabilized surface and prevent the spread of emissive source areas as playa is exposed. Several DCMs have been field-tested and proven to be effective on playas, while other measures need additional research prior to use at the Salton Sea. Examples of proactive DCMs that could be used at the Salton Sea include surface stabilizers, soil roughening, water-efficient vegetation, vegetated swales, vegetation beach ridge enhancement and roughness elements, such as straw bales. Detailed descriptions of DCMs are included as Appendix E. Some of these measures require further pilot field testing to understand their effectiveness on Salton Sea playa (Section 3.2.1.1).

3.2.1.1 PILOT-TESTING FOR NEW DUST CONTROL MEASURES

The dust control strategy includes the development and testing of new DCMs for proactive control and/or for approval as BACM by the ICAPCD and the EPA. The DCMs will be specifically tailored to the climate and soil conditions on and around the Salton Sea playa and make efficient use of available resources. Some DCMs have been field-tested and proven to be effective and some DCMs need additional research prior to use at the Salton Sea. For the more novel and untested approaches, pilot field testing (pilot projects) will occur. The purpose of the pilot projects will be to perform field tests to understand DCM performance on the Salton Sea playa and to support ICAPCD and EPA approval of these DCMs as BACM.

As part of this SS AQM Program, IID is working cooperatively with Imperial County and ICAPCD on several DCM pilot projects. A surface stabilizer pilot project was completed in 2011 and surface roughening and plant community enhancement pilot projects were implemented in 2015. A vegetated swale pilot project is currently being planned. Pilot project sites were selected to represent the range of future playa surface and emission characteristics. Potential sites also were screened according to factors influencing their suitability, including, but not limited to: size, land ownership, permitting challenges, compatibility with anticipated operations and potential future land uses.

Pilot projects will allow IID, the Imperial County and ICAPCD to gain experience and understanding of novel, locally-adapted methods of DCMs and the site-specific factors that could affect their feasibility and cost. Pilot projects also are useful for determining the effectiveness of a DCM and refining design criteria for full-scale implementation. This helps develop efficient approaches for the design, construction and operation of DCMs on the playa.

3.2.1.2 ANNUAL PROACTIVE DUST CONTROL PLANNING AND IMPLEMENTATION

Results from the playa emissions inventory (Section 3.1) will be used to develop an Annual Proactive Dust Control Plan. The plans will be developed by IID in the first quarter of every year and may be done
in consultation with the Imperial County and ICAPCD. They will include a synthesis of monitoring data for the prior year and will identify and prioritize areas for implementation of proactive DCMs. The plans may also incorporate considerations related to the transition of proactive dust control areas to alternative land uses, such as agriculture or habitat restoration.

### 3.2.2 ICAPCD Regulation VIII Rules for the Salton Sea Playa

IID intends to develop a proactive dust control strategy that complies with the regulatory requirements of ICAPCD and SCAQMD. However, IID recognizes that it may not be possible to maximize a proactive dust control strategy within existing rules and regulations. Therefore, there is a need to identify opportunities to establish new procedures and rules and/or improve existing procedures and rules to fully and successfully implement an effective dust control strategy to the maximum extent possible.

Exposed Salton Sea playa is subject to the ICAPCD Regulation VIII Rules related to the control of fugitive dust (see Section 2.3.2). Exposed Sea playa is currently subject to Rule 804 (see Section 2.3.2.2). There are several limitations in Rule 804 that would need to be addressed to allow maximum flexibility in implementing a proactive dust control strategy, including new DCMs specifically tailored to conditions on and around the Salton Sea playa.

The following list summarizes some of the limitations of Rule 804 and approaches for addressing them.

- **Rule 804 applies to all persons who own or otherwise have jurisdiction or control over an open area. Landowners of exposed playa should have an opportunity to implement dust control in coordination with a responsible third party. While Rule 804 does not prohibit this from occurring, it does not specifically identify this opportunity and how it would work within the rule framework. Potential benefits for the ICAPCD include consolidated points of contact, improved coordination of dust mitigation (particularly for small, fragmented parcels) and consolidated responsible party resources.**

- **The existing definitions of a stabilized surface do not consider exposed playa surface characteristics and even though playa surfaces may be stable, they may not meet the definitions in Rule 800. A stabilized surface may be more appropriately defined by a broader set of performance standards and measurements, which could be verified through performance monitoring.**

For areas that do not meet the definition of a stabilized surface, the responsible parties should be able to proactively maintain or create a stabilized surface by any scientifically-based and tested reasonable means. The parties could monitor exposed playa to verify stability. In the event that the surface is not stabilized, then the parties would be required to augment the DCM to achieve stability with more intense control methods. This proactive dust control approach is described in more detail in Section 3.2.1.
• Opacity observations are required to determine compliance with VDE standards, and must be conducted in accordance with the test procedures for “Visual Determination of Opacity” as described in Appendix A of Rule 800. Opacity observations to determine compliance with VDE standards are not an appropriate method to attribute dust plumes to specific source areas on such a vast land surface. Surfaces that meet the definition of stabilized surface should be considered adequately controlled. Furthermore, the air basin is designated as serious nonattainment for PM$_{10}$ and isolated plumes are difficult to identify with standard opacity observations. This is a concern due to the significance of off-lake sources. According to the IC 2009 PM$_{10}$ SIP (page 2-1):

“The vast majority of PM$_{10}$ emissions impacting Imperial County originate from natural, non-anthropogenic sources (for instance, fugitive dust from barren lands alone accounts for >55% of average daily emissions). During high winds, Imperial County’s desert areas can produce PM10 emissions over 50 times greater than the emissions from any anthropogenic source, including agricultural crop land.”

3.2.3 Playa Traffic Management

The dust control strategy includes development and implementation of a playa traffic management plan. Extensive desert areas around the Salton Sea attract recreationalists and OHV traffic. OHV use is expected to expand onto the playa as the Salton Sea recedes. This activity will disturb the natural stability of playa crust and soil surfaces and increase erodibility and PM$_{10}$ emissions. This is caused by the physical destruction of the fragile crusts by passes of vehicle tires. Tires pulverize the surface into sand-sized particles (Figure 3-15). These particles are then picked up by the wind, commencing saltation, and leading to loosening of many more particles downwind. This cascading effect increases erodibility on and around designated trails. The larger the footprint of vehicle use (through repeated passes), the larger the impact on the fragile playa crust.
Prevention of vehicle related disturbances is the most important and cost-effective measure available to prevent and control emissions. Therefore, the playa traffic management plan will focus on limiting public access on fragile playa crusts to the extent legally and reasonably feasible. The ICAPCD, Bureau of Land Management (BLM) and California State Parks have found that approaches such as public outreach, education, sign posting, strategic fencing, gate installation and selectively closing or maintaining roads and trails are effective methods to control OHV activity. Therefore, rather than physical restriction of playa access, this SS AQM Program will focus on developing a plan that includes these approaches (Table 3-6).

**TABLE 3-6. PLAYA TRAFFIC MANAGEMENT PLAN – PROGRAM ITEMS AND APPROACH**

<table>
<thead>
<tr>
<th>Program Item</th>
<th>Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partnership and</td>
<td>• Leverage partnerships relative to resource areas. Work cooperatively with partners to share resources and effectively manage OHV use around the Salton Sea.</td>
</tr>
<tr>
<td>Educational Efforts</td>
<td>• Initiate public outreach effort which encourages OHV users to adopt a land use ethic that responsible OHV riders respect land resources and do not travel cross playa off roads and trails except in managed open areas.</td>
</tr>
<tr>
<td></td>
<td>• Develop an education program in partnership with other federal and state agencies, counties, tribes, communities, OHV dealerships, user and other interest groups to teach the recreating public about the value of public land resources and how they can protect the environment while enjoying their recreation activities.</td>
</tr>
<tr>
<td>Land Use / Playa</td>
<td>• Identify sensitive land resource and biological resource areas.</td>
</tr>
<tr>
<td>Planning</td>
<td>• Determine appropriate use of these areas (if any).</td>
</tr>
<tr>
<td></td>
<td>• Special emphasis on sensitive areas – Managing sensitive areas to ensure non-impairment.</td>
</tr>
<tr>
<td>Program Item</td>
<td>Approach</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Restrictive Orders and Monitoring | • Encourage the public to adopt a land use ethic that, except in managed open areas, cross country travel off roads and trails should no longer be considered a responsible use of vehicles.  
• Restrict vehicle use through signage, enforcement and education in: sensitive playa areas, mitigation facilities, habitat facilities, energy facilities, cultural sites, etc.  
• Ensure compliance through increased enforcement, posting signs, providing information and monitoring activities and impacts. Work to gain the cooperation and assistance of local government, private citizens and interest groups in completing these actions and obtaining voluntary compliance. |
| Adaptive Management               | • Periodically look back at approach in place. Identify lessons learned and incorporate those into the revised management approach with partners.  
• Through monitoring results, identify if/where existing trails need to be augmented.                                                                                     |

With the help of the basic framework outlined in Table 3-6, a Playa Traffic Management Plan will be more fully developed by IID in coordination with the Imperial County, ICAPCD, the resource agencies, California State Parks and other interested stakeholders. The plan will include an assessment element to gauge success of the plan and to determine whether modifications to the plan are necessary.

### 3.3 ESTIMATED PROGRAM COSTS

This section describes the rationale for estimating SS AQM Program costs. The cost estimates and assumptions described below should be considered “order of magnitude” because they were prepared without the benefit of site-specific dust control criteria or detailed designs necessary for more accurate cost estimation. Therefore, these estimates are for planning purposes only, derived from experience at Owens Lake and based on the assumptions outlined in the following sections.

#### 3.3.1 COST ASSUMPTIONS

The following sections detail the assumptions used to develop long-term estimated program costs associated with implementing this SS AQM Program.

##### 3.3.1.1 RATE OF PLAYA EXPOSURE

The timing and location of future playa exposure is a function of the hydrologic response of the Salton Sea to external forces, such as inflows, salt loads and evaporation rates. This cost estimate uses reasonable incremental playa exposure acreage estimates, which will be adjusted according to the results of the updated SALSA2 modeling that will be published in the hydrologic report anticipated to be released this summer. It is clear that actual playa exposure rates will affect the amount of playa that may become emissive and ultimately require dust control, thereby affecting the program costs.

For the purpose of estimating costs, a series of 6 construction phases between 2020 and 2045 were identified as dust control implementation periods. Yearly playa exposure estimates were then aggregated to these timeframes and considered in the cost estimate calculations (Table 3-7).
TABLE 3-7 PLAYA EXPOSED FOR EACH CONSTRUCTION PHASE (ROUNDED TO THE NEAREST THOUSAND)

<table>
<thead>
<tr>
<th>Year / Phase</th>
<th>Playa Exposed Per Phase (Acres)</th>
<th>Total Playa Exposed (Acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020 / Phase 1</td>
<td>25,000</td>
<td>25,000</td>
</tr>
<tr>
<td>2025 / Phase 2</td>
<td>21,000</td>
<td>46,000</td>
</tr>
<tr>
<td>2030 / Phase 3</td>
<td>13,000</td>
<td>59,000</td>
</tr>
<tr>
<td>2035 / Phase 4</td>
<td>6,000</td>
<td>65,000</td>
</tr>
<tr>
<td>2040 / Phase 5</td>
<td>3,000</td>
<td>68,000</td>
</tr>
<tr>
<td>2045 / Phase 6</td>
<td>2,000</td>
<td>70,000</td>
</tr>
</tbody>
</table>

3.3.1.2 EMISSIVE CHARACTERISTICS OF THE PLAYA

The vast majority of the future exposed Salton Sea Playa is currently inundated. This makes it difficult to estimate the acreage of future playa that will be emissive (including the magnitude, timing and location of emissions) and require dust control. Restoration activities, including habitat projects and renewable energy development, on the future exposed playa are also uncertain with regard to location, size and timing. Additionally, other land management activities, which may or may not be included in the State’s restoration activities, but may occur for other reasons are uncertain as well. Given these unknowns, the cost estimates assume 75 percent of the total playa exposure will be open, emissive and require some level of dust control. As a point of comparison, roughly 60 percent of the exposed Owens Lake playa is currently controlled.

3.3.1.3 DCMs APPROVED AS BACM

The types of DCMs available for implementation on future Salton Sea playa is an important component of the cost estimate. As described in Section 2.3.2.2, all exposed playa within the Imperial County is currently subject to ICAPCD Rule 804, Open Areas. Permissible BACM for open areas include: (1) applying water or chemical dust suppressants to all unvegetated areas, (2) establishing vegetation on previously disturbed areas, and (3) paving, applying and maintaining gravel, or applying and maintaining chemical dust suppressants. Additionally, alternative BACM may become permissible BACM once it has been approved by ICAPCD and the EPA according to the procedure outlined in Rule 804.

This SS AQM Program focuses on developing a proactive dust control strategy specific to the Salton Sea with DCMs that are science-based, practical, effective and feasible, and are anticipated to be approved as BACM for Salton Sea surfaces. While IID recognizes that air quality is ultimately regulated by the local air quality districts and the EPA and this program is structured to work with those agencies and within the applicable regulations, this program takes a broad and proactive approach that is not limited to currently approved BACM. This program anticipates further coordination with the local air quality districts and the EPA as described in Section 4. Nevertheless, an important step in that coordination is DCM pilot projects and studies, which will be a basis to expand the list of DCMs available for approval as BACM.

There are a significant amount of scientific and experience-based resources informing the development of this SS AQM Program. However, there are many unknowns that cannot be known for the Salton Sea until pilot-testing can be done on exposed Salton Sea playa with specific DCMs. DCM pilot projects are
necessary to inform all interested parties of the broad range of technical issues associated with dust control implementation on the Sea playa. This includes factors such as hydrology, vegetative cover establishment, dust control effectiveness required, water supply planning, constructability and appropriate design criteria to meet dust control objectives.

For purposes of the program cost estimates provided in this SS AQM Program, Table 3-8 outlines the percentage breakdown of DCMs assumed for currently approved BACM under ICAPCD Rule 804 and, for comparison, DCMs anticipated to become approved BACM (both assume DCMs on 75 percent of total exposed playa). The assumptions made in Table 3-8 take the most cost-effective breakdown of DCMs under each scenario purely for informational purposes of providing a program cost estimate. In addition to estimated cost-effectiveness, the DCM percentage breakdown was developed using available surface soil texture information (Section 3.1.1.3). Approximately 42 percent of the future exposed playa will consist of fine textured soils suitable for surface roughening and/or moat and row; 36 percent medium textured soils potentially suitable for surface roughening, moat and row or vegetation establishment; and 22 percent coarse textured soils suitable for vegetation establishment. Table 3-8 is not a plan or proposal for specific DCMs to be implemented on exposed Salton Sea playa. The percentage of DCMs may be revised at any time and will be revised as actual exposed playa is mitigated by the implementation of specific DCMs. As discussed in this program, decisions regarding the type, location and timing of implementing DCMs on exposed playa are to be made on an annual basis as playa is exposed and analyzed to determine the dust control strategy needs of that playa and other contributing outside factors, such as available funding.

ICAPCD Rule 804 currently has only a limited number of approved BACM: water efficient vegetation (to achieve the 50 percent cover requirements), shallow flooding, chemical dust suppressants and gravel cover. This SS AQM Program takes a proactive approach that is not limited by approved BACM, but anticipates that all DCMs outlined in Appendix E will be approved as BACM as allowed under the alternative BACM process under Rule 804.

**Table 3-8 Assumed DCM Implementation Percentages for Approved BACM Under ICAPCD Rule 804 and All DCMs Identified in This Program**

<table>
<thead>
<tr>
<th>DCM</th>
<th>Rule 804 Approved BACM</th>
<th>All Identified DCMs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface Roughening</td>
<td>0%</td>
<td>42%</td>
</tr>
<tr>
<td>Moat and Row</td>
<td>0%</td>
<td>3%</td>
</tr>
<tr>
<td>Dust Suppressants</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Veg. Enhancement</td>
<td>0%</td>
<td>35%</td>
</tr>
<tr>
<td>Veg. Swale</td>
<td>0%</td>
<td>10%</td>
</tr>
<tr>
<td>Water Efficient Vegetation</td>
<td>85%</td>
<td>7%</td>
</tr>
<tr>
<td>Shallow Flood</td>
<td>10%</td>
<td>2%</td>
</tr>
<tr>
<td>Brine Stabilization</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td>Gravel Cover (2 inch thickness)</td>
<td>5%</td>
<td>0%</td>
</tr>
<tr>
<td>Gravel Cover (4 inch thickness)</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>
3.3.1.4 DCM UNIT COST

A description of each DCM used in this cost estimate is provided in Appendix E. The estimated capital costs per DCM (Table 3-9) include construction costs plus engineering design, construction management and engineering services during construction. Operation and maintenance costs (Table 3-9) are based on an assumed percentage of construction cost. It is important to note that these cost estimates are reasonable and based on actual experience at the Salton Sea or Owens Lake, with the exception of dust suppressants, which involves a product that can be priced and purchased. However, air quality mitigation at Owens Lake is the only similar and comparable situation to that of the Salton Sea and that situation is very different from the Salton Sea in many respects including timing of implementation and the largely reactive approach that has been taken. There are no documented resources for costs specific to air quality mitigation associated with these DCMs implemented on a large-scale area of varying soil characteristics and other factors to be considered. Therefore, these cost estimates remain high-level estimates of DCMs that have largely not been performed at the Salton Sea to date and where design, construction and engineering costs may be greatly affected by the unique location, climate and other factors associated with this area. These cost estimates will be refined as this SS AQM Program is implemented.

### TABLE 3-9 ESTIMATED DUST CONTROL MEASURE UNIT CAPITAL AND O&M COSTS (2014$)

<table>
<thead>
<tr>
<th>Dust Control Measure</th>
<th>Capital (Per Acre)</th>
<th>Estimated O&amp;M (% of Capital)</th>
<th>Information Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface Roughening</td>
<td>$400</td>
<td>75.00%</td>
<td>IID AQ Program to date</td>
</tr>
<tr>
<td>Moat and Row</td>
<td>$14,000</td>
<td>10.00%</td>
<td>LADWP personal communication</td>
</tr>
<tr>
<td>Dust Suppressants</td>
<td>$2,000</td>
<td>100.00%</td>
<td>Cargill (Magnesium Chloride)</td>
</tr>
<tr>
<td>Vegetation Enhancement</td>
<td>$9,000</td>
<td>7.50%</td>
<td>IID AQ Program to date</td>
</tr>
<tr>
<td>Vegetative Swale</td>
<td>$17,000</td>
<td>7.50%</td>
<td>IID AQ Program to date</td>
</tr>
<tr>
<td>Managed Vegetation</td>
<td>$25,000</td>
<td>4.50%</td>
<td>LADWP personal communication</td>
</tr>
<tr>
<td>Shallow Flood</td>
<td>$25,000</td>
<td>2.00%</td>
<td>LADWP personal communication</td>
</tr>
<tr>
<td>Brine Stabilization</td>
<td>$21,000</td>
<td>0.25%</td>
<td>LADWP personal communication</td>
</tr>
<tr>
<td>Gravel Cover (2 inch thickness)</td>
<td>$36,000</td>
<td>0.25%</td>
<td>LADWP personal communication</td>
</tr>
<tr>
<td>Gravel Cover (4 inch thickness)</td>
<td>$48,000</td>
<td>0.25%</td>
<td>LADWP personal communication</td>
</tr>
</tbody>
</table>

Cost assumptions for water conveyance infrastructure (Table 3-10) were obtained from the Salton Sea Ecosystem Restoration Program, Draft Programmatic Environmental Impact Report (PEIR), Appendix H. Cost estimates from the PEIR were adjusted to 2014 dollars using the U.S. Department of Commerce, Bureau of Economic Analysis, Table 1.1.9. Implicit Price Deflators for Gross Domestic Product [Index numbers, 2009=100] seasonally adjusted values. It was assumed that costs for this infrastructure would begin two years prior to the first dust control construction phase. Water conveyance is likely required to facilitate irrigation of vegetation in certain areas, especially in locations where groundwater cannot be accessed, and potential water based DCMs on the playa as the Sea recedes.
Table 3-10 Capital Cost Estimates for Conveyance Infrastructure as Presented in the PEIR for Air Quality Management

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sedimentation Basin</td>
<td>40,776,000</td>
<td>46,741,835</td>
</tr>
<tr>
<td>Roads</td>
<td>689,000</td>
<td>789,806</td>
</tr>
<tr>
<td>Western AQM Canal (70 cfs, 42 mi)</td>
<td>30,224,000</td>
<td>34,645,998</td>
</tr>
<tr>
<td>Eastern AQM Canal (60 cfs, 40 mi)</td>
<td>25,845,000</td>
<td>29,626,318</td>
</tr>
<tr>
<td>Central AQM Canal (40 cfs, 10 mi)</td>
<td>4,555,000</td>
<td>5,221,431</td>
</tr>
<tr>
<td>Saltwater Conveyance for AQM</td>
<td>13,740,000</td>
<td>15,750,265</td>
</tr>
<tr>
<td>Pupfish Channels (30 mi)</td>
<td>9,110,000</td>
<td>10,442,861</td>
</tr>
<tr>
<td>Other Construction (5%)</td>
<td>6,246,950</td>
<td>7,160,926</td>
</tr>
<tr>
<td><strong>Construction Subtotal</strong></td>
<td>131,185,950</td>
<td>150,379,439</td>
</tr>
<tr>
<td>Contingency (30%)</td>
<td>39,355,785</td>
<td>45,113,832</td>
</tr>
<tr>
<td>Engineering, Legal, and Administration (12% of Construction Costs)</td>
<td>20,465,008</td>
<td>23,459,193</td>
</tr>
<tr>
<td><strong>Total Capital Cost</strong></td>
<td>191,006,743</td>
<td>218,952,646</td>
</tr>
<tr>
<td><strong>Yearly O&amp;M (3.5% of Construction)</strong></td>
<td>4,691,508</td>
<td>5,263,280</td>
</tr>
</tbody>
</table>

Notes:
Values have been rounded and may not add directly.
Values from the PEIR PNA, Appendix H7 are in 2006 dollars and have been escalated to 2014 dollars using U.S. Department of Commerce, Bureau of Economic Analysis, Table 1.1.9. Implicit Price Deflators for Gross Domestic Product [Index numbers, 2009=100] Seasonally adjusted.
All values do include costs for land acquisition, easement, or taxes.
AQM = Air Quality Management

3.3.2 Estimated Program Costs

Using the assumptions outlined in Section 3.3.1, a spreadsheet calculator was developed to estimate costs (using 2014 dollars) through 2076 for currently approved BACM under ICAPCD Rule 804 and the proactive dust strategy using all DCMs identified in this SS AQM Program. The spreadsheet calculator was developed to facilitate changes in assumptions outlined in Section 3.3.1 as more is learned through implementation of this SS AQM Program (e.g., dust control implementation schedule, emission characteristics of the playa, DCM costs, BACM approval, etc.). Table 3-11 provides a summarized version of the total cost on a five-year time step. Given the uncertainty associated with the assumptions outlined in Section 3.3.1, a -15% and +25% multiplier was applied to the final estimate to generate a cost range.

For implementation of the BACM currently approved under Rule 804, the total cost estimate in 2047 (timeframe of estimated maximum playa exposure) is $2.86BN, with a range of $2.43BN to $3.58BN. For implementation of the DCMs identified in this SS AQM Program regardless of approval as BACM, the total cost estimate in 2047 is $1.49BN, with a range of $1.27BN to $1.86BN. Estimated costs for
implementation of the BACM currently approved under Rule 804 in 2076 (at the end of the water transfer) is $4.56BN, ranging from $3.88BN to $5.70BN. Estimated costs for implementation of the DCMs identified in this SS AQM Program regardless of approval as BACM for this same timeframe is $2.59BN, ranging from $2.11BN to $3.24BN. As discussed above, these are high-level estimates intended for informative purposes only and will be refined as this SS AQM Program is implemented and more is learned from this implementation.

As shown in Table 3-11, the estimated cost of implementing BACM currently approved under Rule 804 is nearly double the cost of the implementation of the DCMs identified in this SS AQM Program regardless of approval as BACM. This is mainly due to the limited amount of BACM currently available under Rule 804 as well as the 50% cover requirements for vegetation in Rule 804. This underscores the need for IID to continue work with the Imperial County and ICAPCD immediately to seek approval of alternative BACM under Rule 804 and to identify opportunities to establish new procedures and rules and/or improve existing procedures and rules to fully and successfully implement this SS AQM Program. As stated previously, such opportunities should include new BACM performance measures (i.e., determining if the surface is adequately stabilized).

**TABLE 3-11 Summary of Dust Control Total Costs (2014$)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Rule 804 Approved BACM Estimated Cost ($BN)</th>
<th>All Identified DCM Estimated Cost ($BN)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Cost</td>
<td>Total Cost (-15%)</td>
</tr>
<tr>
<td>2020</td>
<td>$0.60</td>
<td>$0.51</td>
</tr>
<tr>
<td>2025</td>
<td>$1.25</td>
<td>$1.06</td>
</tr>
<tr>
<td>2030</td>
<td>$1.72</td>
<td>$1.46</td>
</tr>
<tr>
<td>2035</td>
<td>$2.09</td>
<td>$1.77</td>
</tr>
<tr>
<td>2040</td>
<td>$2.42</td>
<td>$2.06</td>
</tr>
<tr>
<td>2047</td>
<td>$2.86</td>
<td>$2.43</td>
</tr>
<tr>
<td>2050</td>
<td>$3.04</td>
<td>$2.58</td>
</tr>
<tr>
<td>2055</td>
<td>$3.33</td>
<td>$2.83</td>
</tr>
<tr>
<td>2060</td>
<td>$3.63</td>
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<tr>
<td>2065</td>
<td>$3.92</td>
<td>$3.33</td>
</tr>
<tr>
<td>2070</td>
<td>$4.21</td>
<td>$3.58</td>
</tr>
<tr>
<td>2076</td>
<td>$4.56</td>
<td>$3.88</td>
</tr>
</tbody>
</table>
4 AGENCY COMMUNICATION, COORDINATION AND REPORTING

This section describes agency communication and coordination, as well as a summary of reporting.

4.1 AGENCY COMMUNICATION AND COORDINATION

As described in detail in this document, this SS AQM Program is focused on monitoring and mitigating dust emissions from exposed Salton Sea playa. Accordingly, communication and coordination with several local, state and federal agencies, as well as other stakeholders, will be essential to the success of this program. Different agencies will be involved in different aspects of this program. For instance, the Imperial County, ICAPCD, SCAQMD, CARB and EPA will need to be involved in efforts to expand approved BACM. IID will be communicating and coordinating with the Natural Resources Agency and other state agencies to ensure that the State's restoration activities are informed by and coordinated with the implementation of this program and that, likewise, air quality mitigation activities are informed by and coordinated with the State's restoration activities. Further, the QSA JPA and its member agencies will be involved for funding purposes according to the process described above (Section 2.1.2). IID will coordinate implementation of this SS AQM Program with these agencies and stakeholders as necessary and on an on-going basis. Additionally, IID anticipates that quarterly progress updates will be provided as appropriate and in a forum or format to be determined. IID will prepare an annual progress report that will document detailed aspects of implementation of this program on an annual basis.

4.2 SUMMARY OF REPORTING

A variety of documents will be prepared throughout implementation of this SS AQM Program. Documents may include: technical memoranda describing results of research and monitoring activities; Annual Proactive Dust Control Plans (Section 3.2.1.2); conceptual and final designs for DCMs; and outreach materials for the general public. Progress reports as described above will also be prepared to document progress and findings from implementation of this SS AQM Program. IID will ensure that final and complete materials will be available to the public and posted to the IID website.
5 REFERENCES


